



amateur radio

Vol. 39, No. 1

JANUARY, 1971

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amateur radio

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CONTENTS

Technical Articles:—

	Page
Harmonics, Lecture No. 108	8
How Many Mikes?	7
Results of 1970 Victorian 432 MHz. Antenna Gain Contest	10

General:—

AMSAT 1970 Annual Report	15
Australian D.X.C.C. Countries List	12
Australian DX Century Club Award	11
Australian VHF Century Club Award	11
Awards for Technical Articles	18
B.A.R.T.G. Spring RTTY Contest	20
Book Review: Amateur Radio Techniques	21
Canberra Easter Convention	17
Central Coast Award	20
Change in Intruder Watch Co-ordinator in N.S.W.	15
Cook Bi-Centenary Award	17
Correspondence	22
Federal Comment	3
Higginbotham Award	18
La Balsa—A Triumph for Amateur Radio	4
Licensed Amateurs in VK at August 1970	16
New Call Signs	17
N.Z.C.—New Zealand Counties Award	9
Obituary	20
Operation from Two N.Z. Counties	20
Overseas Magazine Review	21
Prediction Charts for January 1971	18
Silent Key	22
So You Have Changed Your OTH	18
Telecommunications and Electronics (S.A.A. Report)	20
The Call Book	16
VHF	19
W.I.A. D.X.C.C.	16

COVER STORY

Arrows point to the insulators at the top and bottom of the 14 MHz. quarter wave vertical aerial on the starboard leg of La Balsa's mast. See story on page 4.

FEDERAL COMMENT

It was my original intention to devote this Federal Comment to a review of the year just past. I would have preferred to have paid tribute to all those who made the 60th year of the Institute such a special year, particularly all those who supported the Cook Bi-Centenary Award so magnificently, and who turned it into one of the high points in the history of Amateur Radio in Australia.

Unfortunately I cannot do this. At a time when I know that so many of you are on a holiday, I must turn, not to the past, but to the present and to the future. In this holiday season, as I convey to you all the Season's Greetings of the Federal Council and the Federal Executive, I have also to tell you of the serious crisis that we face, and seek your support for the solution we propose.

That we faced a very real crisis in our Federal Administration and with this magazine has been apparent for some time. Both have, since their inception, relied on the labour of honorary officers. But as the years have passed, so our organisation has grown. What was once basically a social group with a common interest has grown into an organisation that is fundamental to our very existence.

The amount of work done by officers such as the Federal Secretary, the members of the Federal Executive generally and those responsible for this magazine has grown to the extent that it is no longer possible to maintain the present level of activity by reliance on volunteers alone. How many of us realise the hours of work each week, each day, that the Editor of "A.R." or the Federal Secretary is called upon to do? I joined the Federal Executive after the Easter 1968 Federal Convention. Before that, as Victorian Federal Councillor, at each Convention, I had been able to sit back and offer the Federal Executive the benefit of my advice as to how they should undertake the many tasks they faced. Now I realise only too well how much work must be done.

Certainly we express our gratitude to those doing the work. But to those people neither gratitude nor the satisfaction of doing something worthwhile is enough. The job itself is too big. They want to be able to earn their

living without having to steal time for the Institute. They want to be able to spend a reasonable time with their families. They even want to enjoy their hobby. In a word, they want "out".

The use of volunteers has slowly drifted into the exploitation of volunteers. These are hard words indeed, but I can assure you, they are justified.

What are the choices open to us?

There are only two. To be effective, and I do believe that at present the Institute is effective, and that the magazine is effective, we cannot do less than we are doing now. Indeed, we are not doing all we should; I am particularly unhappy that we are not giving the Federal Councillors, or the members, nearly as much information as we should. No, we cannot cut back and remain effective.

Can we use even more volunteers? Already, in the metropolitan area of Melbourne there is one job going for each 5½ full members. Quite apart from the fact that we have reached a level of saturation, administration cannot be channelled through an indefinite number of people. In the end, the co-ordination of that kind of administration takes just as much effort as the job itself.

Our choice is simple. We can either have a paid, high level permanent administration, both for the Federal body and the magazine, or we can go back to a vastly lower level of activity and effectiveness, where things *might* be done when someone has the time, with the magazine perhaps duplicated and produced five or six times a year.

The Councils of the New South Wales Division and the Victorian Division have, together with Federal Executive, exhaustively examined the problem. They realise that we cannot go back, and the only solution is the first one.

This means that each member will have to pay more in subscriptions each year. Despite this, both the Victorian and New South Wales Divisions have pledged to a programme involving the employment of a Secretary/Manager. Events have moved quickly. Executive has been able to inform some Divisions, but not all, as fully as we would have wished.

To our surprise, we have found nothing but support. Our members seem to have been more aware of the problem than perhaps we thought. In this issue we advertise for a person to fill this post. Remember, when you read this advertisement, that how our organisation grows will depend very much on the man we get. Accordingly, we are looking for a man with top ability and experience, mainly administrative.

The cost to each member rather depends on the financial structure of the member's Division. Some Divisions will be able to effect some economies by the utilisation of the proposed centralisation of certain records, feasible with a permanent administration. Generally speaking, the direct increase to members in the smaller Divisions (which have lower fees than the larger Divisions) will be greater. It will not be more than \$3 per annum.

I earnestly seek your support. Each member can do two things. First, give your Division your support in these moves. Let your Division know they have your support; when faced with a need to increase subscriptions we are always hesitant. It's not that we do not wish to pay the increase ourselves, it's just that we are worried about the other fellow. We are all "other fellows"—let your Division know that they do not have to fear a general exodus if they increase the fees.

Secondly, each of you can do something to get new members. Only 54% of all licensees are members of the W.I.A. Please, take the time to have a look at the table set out on page 16 of the April 1970 issue. The 46% who are not members take the benefit of the privileges obtained and the protection given by the W.I.A. No membership drives can be as successful as the efforts of each individual member to get new members. The more members we have to share the burden, the lighter the burden is on each individual.

Yes, I would rather have written a Federal Comment dealing with the achievements of the Institute, but this matter cannot wait until February. In my report to the Federal Council last year I said that I believed that the Institute can justify the support it needs.

May we count on your support?

—MICHAEL OWEN, VK3KI,
Federal President, W.I.A.

La Balsa—a Triumph for Amateur Radio

By DON MARSHALL*

THE search could be likened to looking for a needle in a haystack. In fact, it was for little more than a switch click somewhere in the Pacific Ocean south of the Equator!

The fact that through the perseverance of Amateur Radio operators in at least four countries, and perhaps only because of their discovery, has the incredible story of La Balsa been told.

It is now history that Vital Alsar, a Spaniard, Marc Modena, a Frenchman, Normand Tetreault, a Canadian, and Gabriel Salas, a Chilean, left Ecuador, South America, on a balsawood log raft last May 29.

On November 4 at 11.50 p.m., they arrived under tow in the Mookoolaba River, 65 miles north of Brisbane, after a voyage of 8,500 miles.

The report of their Amateur Radio activities during that time, as compiled from the men and operators, will have a special place in the minds of all who took part or who at least heard the raft signals.

Although Vital Alsar was primarily an adventurer seeking to prove that an ancient type raft could be sailed with some direction, he also realised some modern radio gear, together with a petrol generator and a fuel supply, would be a necessity on his raft.

On the advice of his friend, Vice-Admiral Samuel Fernandes, a Mexico City Ham, XE1EB, and radio co-

ordinator Raphael L. Corcuera, XE1EE1, a business man, of Guadalajara, Mexico, Vital installed a Hallicrafters SR-150 transceiver.

Installation was under the eye of electronics engineer Joe HC2OM, of Guayaquil, Ecuador, where the raft was built.

Vital was given the call sign of HC9EBP/MM.

The transceiver was largely pre-set to operate on about 14,105 KHz. to limit operating time and thus exposure to the sea air.

The radio was stored in the plaited cane cabin and protected by eight plastic bags.

The aerial was a quarter wave loaded vertical mounted on two insulators taped to the starboard leg of the mast with a lead into the cabin.

Transmissions after the raft started its cross-Pacific drift were good with regular s.s.b. contacts to Fernandes and Corcuera and later with Liliana HC2IS.

Vital joined in La Rueda, the wheel in Spanish but radio net in English, every four days with hardly any interference.

Besides the Mexican and Ecuador stations, there were calls from Nicaragua, San Diego (California) and Montreal (Luc VE2BBS).

Raphael was even able to arrange a rendezvous with a U.S. Navy ship when the La Balsa was down to half a gallon of petrol from an original 17 gallons—enough only for an hour and a half's operating.

MICROPHONE USELESS

In mid-September came a storm in which waves reached 30 feet and the transceiver in its plastic bags was put under the ceiling for safety as water swept through the cabin. Some shack!

It was little wonder then that on October 3 with the raft east of New Caledonia and approaching the most dangerous part of the voyage, the microphone became faulty.

The next day it failed.

Vital tinkered with it while Raphael and the Admiral, so far away, wondered what to do.

But Vital shorted out the insert so that by pushing the microphone switch he could trigger a signal.

The Admiral devised the system where Vital could give an affirmative answer by pressing the microphone switch and remaining silent for a negative answer.

Then by transmitting digits one-two-three and so on, and listening in between each, he could get a signal from Vital giving the raft's longitude, latitude, air and sea temperatures, wind direction and strength, sea conditions and the condition of those on board.

ZL THEN VK HELP

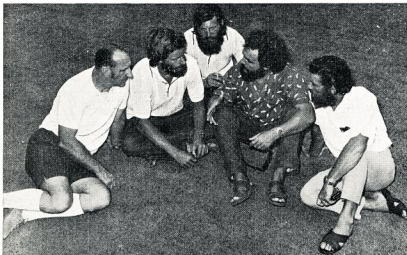
Enter into this strange communication, Mr. A. T. "Gus" Knox, ZL1RO, of Epsom, Auckland, an Air New Zealand operations man.

The Mexicans explained all and said that although the raft seemed to hear



OSL CARD
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LA BALSA

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Raft discussion. From left: Keith VK4KS, Marc Modena, Normand Tetreault, Vital Alsar and Gabriel Salas. Photo courtesy The Courier-Mail, Brisbane.

them without difficulty, they were having growing difficulty in hearing the reply clicks as the raft drifted west.

At this time, the signals were travelling more than 6,500 miles.

Gus offered to help since with his rotating beam he could hear the clicks easily and his signal on the raft was strong.

This was October 10 and the raft was in danger from the D'Entrecasteaux Reefs ahead, a danger apparently not realised by the men back in Mexico.

A suggestion that a new microphone be dropped from the air was not taken up.

Luckily, the raft passed the northern end of New Caledonia and headed west in the current towards Australia.

On October 12, the raft's position was 162 deg. 43 min. E., 17 deg. 38 min. S., and from that day an alternate day schedule was kept.

For three weeks, Gus hurried home from his job to relay the Mexicans' questions and to relay the clicked replies.

Meanwhile in Sydney, Syd Molen, VK2SG, a senior t.v. technician, had heard about the proposed drift from Raphael, one of his regular contacts.

He had listened on the set frequency but had never talked to La Balsa, so as not to waste the raft's power.

Raphael asked Syd if he would have a go at taking over contact with the raft and Syd made his first contact on his home-brew gear from his 12 ft. x 12 ft. shack at Pendle Hill on Oct. 24.

Then it was his turn to take over from Gus and transmit the questions and then the replies. Gus stood by.

By October 28, the sea temperature had risen 3°C. in two days, which tended to confirm that they were encountering a warm current from the Coral Sea.

Australia was near at hand, but then there were the treacherous Great Barrier Reefs ahead.

By October 29, Les Bell, VK4LZ, a farmer, of Airlie Beach, near Proser-

pine, North Queensland, and Keith Schleicher, VK4KS, of Aspley, Brisbane, had joined in the relays.

NEWS BREAKS

The first news reports appeared.

It was important that Les and Keith joined in, along with several others known to be listening on the side, since the raft was approaching the Swain Reefs, east of Rockhampton, the southern end of the main Barrier Reef.

By 1.45 p.m. E.A.S.T. on Saturday, October 31, there can be little doubt that scores of beams, including that of Raphael in Guadalajara, and a Solo-

mon Is. man to the north, were swinging to the Coral Sea area.

This scheduled sked had been published in newspapers and broadcast on radio and t.v.

But such was the discipline of all that Syd and Les between them, with Gus and the Solomon Is. station on the side, were able to make contact at 2 p.m. and there was only one breaker for a brief time.

The raft was then becalmed some 250 miles odd out from Rockhampton.

This day, the Brisbane Sunday Mail newspaper spent hundreds of dollars on an aircraft charter to spot and photograph the raft, but, unfortunately, the plane had to return from the area before the raft's exact position was transmitted.

The newspaper telephoned Gus and Raphael to confirm that the raft and its signal were no hoax.

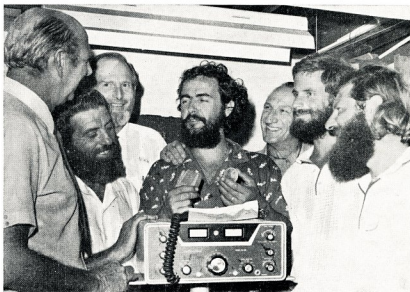
Air Force authorities in Townsville declined news media requests to put one of their Neptune aircraft specially equipped for sea searching into the air. No request had come from Canberra.

Otherwise, official statements that there was no raft, that such a drift was impossible and that the radio signals were a hoax might never have been made.

It was revealed later that the authorities did not have the equipment to pick up the raft's signals. Nor did they have the beam aeriels of the Amateurs concerned that were confirming the raft's position.

SEARCH PERMIT REFUSED

On Sunday, November 1, Civil Aviation Department officers in Rockhampton refused permission to allow a twin-engined aircraft proposed chartered by the Australian Broadcasting Commis-



Hellcrafters Transceiver back for the La Balsa crewmen at a Brisbane DX Radio Club function at the OTH of Keith VK4KS at Aspley, Brisbane, on November 15. Picture shows (from left) Club President Mr. C. I. Patterson, Gabriel Salas, W.I.A. Queensland Division President Norm Wilson (VK4NP), Vital Alsar, Keith Schleicher (VK4KS), Marc Modena and Normand Tetreault. Photo courtesy The Courier-Mail, Brisbane.

sion and then later by the Brisbane Courier-Mail to search for the raft since the search area was too far off the coast.

For reporters and photographers, a major news event was so near and yet so far, and reporters had to rely on Amateur Radio reports.

On Monday, November 2, from 2 p.m. E.A.S.T., there was the normal position report. The raft was sailing south towards Brisbane and all was well. There was a similar report on the Tuesday with Les and Syd making the contact.

Crisis day came on Wednesday, November 4, when the raft reported its position at 154 deg. 20 min. E., 26 deg. 05 min. S., or about 66 miles north-east of Double Island Point on the Australian mainland.

The raft was being buffeted by a 30-knot south-easter. The crew were all well but were worried by the strong wind.

As they felt they were within Australian waters and near landfall, they thought it advisable to request assistance to stand by.

Following the report, two newspapers put separate aircraft up to search for the raft, but in poor visibility and failing light, it was not sighted.

At Airlie Beach, Les offered to stay up all night keeping a listening watch on the frequency. At Syd's suggestion, the raft was back on the air at 8 p.m. It was then only 16 miles east-north-east of Double Island Point with a 30-knot south-easter still blowing.

At Mooloolaba, 50 miles to the south, a pilot launch with a doctor on board put to sea to search unsuccessfully and returned to port soon after midnight.

At 2 a.m. on Thursday, November 5, the fishing launch Capri, chartered by the local Nambour newspaper, left Mooloolaba to search.

By 5 a.m., the Mexicans were back on the air asking Vital his position, which was two miles off Double Island Point. However, lighthouse men there could not see the raft.

At this time, skip distance prevented Brisbane Amateurs from hearing the raft. It was Syd who asked the questions and Les confirmed the raft's replies.

The untold scores of Amateurs who must also have been listening did not break in.

SEEN FROM THE AIR

As air-sea rescue authorities were still maintaining the whole matter was a hoax, the raft was spotted from the air.

After Syd was unable to reach Brisbane authorities by telephone, he asked Keith VK4KS, standing by in Brisbane, to contact them to see if Syd's services were still required. The authorities released Syd and took control.

The raft was later taken in tow by the Capri and it reached Mooloolaba at 11.50 p.m. E.A.S.T.

W.I.A. OFFICIALS

AT WELCOME

There to welcome them on behalf of Amateurs were the W.I.A. Queensland Div. President Norm Wilson (VK4NP), Vice-President Theo Marks (VK4MU), Keith VK4KS and Ken Chiverton (VK4VC).

About 2.30 a.m., Vital was at Norm's station wagon to contact the Admiral (XE1EB) to confirm the end of a fantastic voyage.

But all was not ended there so far as Amateurs were concerned.

The next day Vital paid a visit to the shack of Kev in Nambour and while there was able to communicate with Mexico and Ecuador.

On Friday, November 13, the four crewmen were in Brisbane and visited the shack of Keith for a late lunch and again were able to have a few words with XE1EEI, XE1EB and HC2OM.

Then on Sunday, November 15, they returned to Keith's for a dinner in their honour, given by the Brisbane DX Radio Club and attended by 50 members and their wives.

At this, Vital was presented with a club certificate and made an honorary member. Here, too, the men received back their transceiver, repaired to first class condition.

Salt water spray had got inside and the microphone had been damaged by electrolysis action. Also, the transmitter was putting out only 30 watts, two tubes were "soft" and tuning was poor. Luck had prevailed!

The debt to all Amateur operators involved with La Balsa from Ecuador to Australia has been acknowledged many times since by Vital.

But who would take anything from the magnificence of the feat by four brave men?

TECHNICAL ARTICLES

Readers are requested to submit articles for publication in "A.R.," in particular constructional articles, photographs of stations and gear, together with articles suitable for beginners, are required.

THE WIRELESS INSTITUTE OF AUSTRALIA SECRETARY MANAGER

The Wireless Institute of Australia is a non-profit organisation providing services for and representing Australian Radio Amateurs.

The growth of the organisation has made it necessary to employ a full-time SECRETARY MANAGER.

Location—Melbourne.

Duties—To act as a Secretary to the Federal Executive and to take responsibility for the administration of the organisation; to act as Manager of the organisation's publications.

Qualifications—Proven administrative experience in Commerce, Industry or the Government Service; the ability to keep minutes, write reports and collate information; a knowledge of accounting procedure is highly desirable; must be able to express himself concisely and clearly in writing. Experience in either electronics or Amateur Radio is essential.

Salary to be negotiated from \$5,000 p.a.

Interviews will be conducted in both Sydney and Melbourne. All applications will be strictly confidential. Apply in writing in the first instance, setting out qualifications and experience, to:—

**"SECRETARY MANAGER"
BOX 2611W,
G.P.O. MELBOURNE, VIC., 3001**

HOW MANY MIKES?

COL HARVEY,* VK1AU

Not for the audiophile—but a simple approach to the problem of testing capacitors in the tens of microfarads range

The long standing practice of bridging a replacement capacitor across a suspect electrolytic has much to commend it, particularly in filter and decoupling applications. However, in solid state equipment where even interstage coupling capacitors are likely to be many microfarads, it is generally a nuisance to remove suspect capacitors for test, and more a problem to prove capacitor value and serviceability. As very few Amateurs seem to have access to a polarised capacity bridge, a simple self contained capacity and leakage tester can be a useful substitute. The method used does not give absolute readings, but compares the suspect component with a calibration obtained from newish similar items.

Experience to date shows that capacitor values measured for electrolytics are higher than the equivalent values given by paper capacitors. Apart from the effect of differing leakage, no explanation for this has been attempted. The problem is easily overcome, however, by using a supplementary calibration for paper capacitors in the microfarad range.

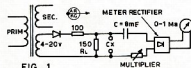


Fig. 1.—The Capacity Meter.

Values are not critical. C is needed to keep d.c. off the meter rectifier. Set meter to full scale by adjustment of the multiplier before connecting condenser under test. Choose a value for the multiplier which will allow f.s.d. with the voltages and meter available.

The concept of the tester is that it should be simple and cheap, should cover the range 5 to 200 μF , provide a leakage test and allow measurements to be made without having to disconnect the suspect item.

Take any half wave a.c. to d.c. rectifier and apply the output to a load resistor. If there is no filter, there will be a substantial a.c. component across the load. A low range a.c. voltmeter can be coupled across the load and the multiplier set to give a full scale reading of the ripple. The more substantial the capacity subsequently placed across the load, the lower the meter reading of ripple. Calibration is then achieved by the simple expedient of recording meter readings against the labelled value of newish capacitors in series-parallel combinations to cover the preferred values in the range 0-200 μF .

Since testing is incomplete unless we have an assurance that leakage is within reasonable limits, we also need to

provide an adjustable source of reasonably pure d.c., and a means of indicating within broad limits the amount of leakage. With low value mica/ceramic capacitors a conventional neon lamp is well proven, but with the higher leakage of electrolytics a less sensitive indication is needed. The meter used to display capacity can therefore be switched (and shunted as required) to read leakage.

There is considerable freedom in the way in which an appropriate test voltage can be obtained, ranging from a simple half wave supply with no choice of voltage; through a voltage doubler arrangement with switched voltage divider networks to provide precise ratings for test. However, with a 250 volt supply, providing a push to test switch is provided, a 2 watt 50K potentiometer can be calibrated to show the approximate voltage available for test. The ultimate choice depends mainly on the characteristics of the available transformer and the size of the instrument cabinet which is to be used.

In practice only one important refinement is needed to the simple capacity test circuit described above. If the capacitor under test, or the test leads are shorted, the output of the transformer rectifier will also be shorted. To avoid the smell of burning insulation, a series resistor of about 50-100 ohms must be used in series with the load resistor. Since both resistors will dissipate about 6 watts (depending on transformer voltage), it is necessary to use wire wound bias resistors together with a diode that will handle 60 mA. plus the peak charging current.

So far as the transformer secondary voltage is concerned, any voltage between 4 and 40 can be used, providing the series resistor is altered to maintain about 5 watts dissipation in the load, and that the meter multiplier is varied to permit full scale deflection with whatever end-voltage results. It is a slight advantage to have some portion of the meter multiplier adjustable from the front panel, so that the scale can be set before each set of readings of capacity.

The meter full scale deflection is not significant either, but the combination of a 6-12 volt transformer secondary and an 0-1 mA. meter has proved very satisfactory. Almost any available junk box combination can be fiddled into a satisfactory device. However, don't forget the low value blocking capacitor to keep d.c. off the meter rectifier.

After the instrument is completed, it is wise to measure the d.c. voltage across the load resistor, so that tests on small electrolytics of lesser working voltage can be avoided.

Calibration is not linear, but the difference between 5 and 8 μF can be seen easily. If the readings of newish electrolytics are graphed, it is a simple matter to extract scale readings corresponding with preferred values, such as 8, 16, 25, 40, 50, 64, 100, 160 μF . By using a parallel rheostat across the test capacitor, the value of in-circuit shunt resistance which will affect the accuracy of readings can be found. In general, a 1,500 ohm bias resistor across 25 μF . will not affect the reading.

As with most test procedures, a few clues as to interpretation of results are sometimes needed. With this gadget—

- A shorted capacitor reads 200 μF .
- A leaky capacitor shunts the ripple and consequently gives an erroneously high capacity reading. If the capacity reading is more than about 20% high on the labelled value—suspect a leaky capacitor and test further.
- Readings less than the labelled value are likely to be valid.
- A low voltage electro run at higher than rated d.c. voltage will initially show excessive capacitance, soon followed by a progressive drop to a low reading of capacity, probably accompanied by overheating.
- Paper capacitors although labelled the same value as electros, do not produce the same scale reading.

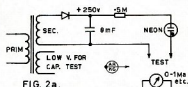


Fig. 2a.

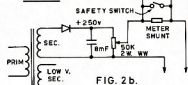


Fig. 2b.

Fig. 2a.—Simple Leakage Tester. For use with paper and mica capacitors. If electrolytics are to be tested frequently, it would be better to make provision for a meter indication of leakage as well.

Fig. 2b. Addition of a potentiometer calibrated for voltage, allows low voltage electros to be checked. The safety switch is needed as a precaution against high charging currents. A normally closed push button switch (such as is used for refrigeration lights) would be ideal. For clarity, switching has been omitted.

HARMONICS

LECTURE No. 10B

C. A. CULLINAN,* VK3AXU

Now it is rather unfortunate that if we operate a valve in its most linear condition its efficiency is low, but luckily it is possible to operate under certain conditions with a considerable increase in efficiency whilst retaining low distortion characteristics.

Let us make some comparisons, taking data from an A.W.V. valve data book after detailing some definitions.

CLASS OF SERVICE

Class A Amplifier

This is a valve amplifier in which the grid bias and the alternating grid voltages are such that plate current in a specific valve flows at all times.

The ideal class A amplifier is one in which the alternating component of the plate current is an exact reproduction of the form of the alternating voltage applied to the grid and plate current flows during the entire 360 degrees of the electrical cycle.

The characteristics of a class A amplifier are low output and low efficiency.

The efficiency of a class A amplifier may lie between 25% and 30%. One main characteristic is that grid current never flows during any part of the exciting voltage cycle.

In most valve type receivers the r.f. stages operate in class A. Also in the early days of radio telephony, using valves, the modulator valves were operated in class A.

Class AB Amplifier

An amplifier in which the grid bias and the applied alternating grid voltages are such that plate current in a specific valve flows for appreciably more than half but less than the entire electrical cycle.

The characteristics of a class AB amplifier are greater output and greater efficiency than a class A amplifier. However, the plate current will not remain steady. The bias is such that without an exciting voltage at the grid, the plate current will be lower than in class A operation and will rise considerably as the exciting voltage increases.

Class AB amplifiers are divided into two types known as AB1 and AB2.

In class AB1 amplifier grid current never flows during any portion of the grid excitation, but the efficiency is greater than in a class A amplifier.

But in class AB2 operation grid current does flow during part of the exciting voltage cycle and greater power can be obtained because the efficiency is still greater.

Class B Amplifier

An amplifier in which the grid bias is approximately equal to the plate current cut-off value so that plate current is approximately zero when no grid exciting voltage is applied, so that plate

Continuing the series of lectures by C. A. Cullinan, VK3AXU, at Broadcast Station 3CS for students studying for a P.M.G. Radio Operator's Certificate.

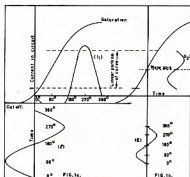
current in a specific valve flows for approximately one half of each cycle when an alternating voltage is applied to the grid.

The characteristics of a class B amplifier are high output and high efficiency (up to 78%).

However, there is a price to pay for this in that grid current may flow for almost the whole of the half cycle, the plate current without grid excitation is low but rises to a very high value with full excitation, hence the regulation of the driver amplifier and that of the power supply must be extra good.

The wave-form of such an amplifier would be generally similar to the current wave 12 in Fig. 1b, from the time axis upwards, with the top made to look more like a sine-wave.

Now as far as audio frequencies are concerned, the use of a single valve in class AB would not be of much use because of the serious distortion which would result (as per Fig. 1b), but, fortunately, there is a way out and that is by connecting two valves in what is known as push-pull.



In this connection one valve amplifies over one half of the exciting voltage cycle and the other valve amplifies over the other half cycle. (In an ideal amplifier.)

The plates of the two valves are connected to a load having the h.t. applied to the centre tap. Usually the load will take the form of a transformer having a centre-tapped primary, into which the actual load has been reflected.

If the two halves of the primary are well balanced as regards inductance, self-capacitance and resistance, then

the output of each valve will combine to produce a complete electrical cycle in the transformer, for each complete cycle of grid exciting voltage, also even-order harmonics (2nd, 4th, 6th, etc.) will cancel and in practice the even-order harmonics, particularly the 2nd, will be virtually non-existent, therefore it becomes possible to obtain good quality audio frequency power from class AB or class B operation. Also, push-pull operation may be applied to two valves in class A.

Class C Amplifier

This is an amplifier in which the grid bias is appreciably greater than the cut-off value so that the valve plate current is zero when no alternating grid voltage is applied, and so that the plate current in a specific valve flows for appreciably less than one half of each cycle when an alternating grid voltage is applied.

The characteristics of a class C amplifier are high plate circuit efficiency and high power output. However, as plate current flows only over portion of the grid voltage cycle there will be a considerable departure from linearity between the grid and plate wave-forms.

Class C amplifiers find their main use in radio frequency applications. For such purposes the valve operates into a tuned circuit, usually known as a "tank circuit" and this has the property of appearing as a "fly-wheel" converting the plate current pulses into a sine-wave usually with considerable harmonic content. Two valves used in class C operation in push-pull will have little even-order harmonic distortion due to the reduction of the even order harmonics because of the push-pull connection.

A similar state of affairs exists if a class B amplifier is operated at radio frequencies and it is possible to obtain excellent linearity if the valve and its associated circuits are correctly adjusted. Such an amplifier is often referred to as a linear amplifier.

Unfortunately a valve used as a class B radio frequency amplifier has low efficiency, about 33.3% and attempts to make it more efficient frequently cause considerable harmonic and intermodulation distortion.

Valve type 6L6 was developed before World War II, and has been a very popular valve. Although designed for audio frequency work, Radio Amateurs soon found that it was excellent at radio frequencies for transmitters, and later a variant called an 807 was developed expressly for high power audio and radio frequency work.

To illustrate the operation of valves as amplifiers under the various classes of operation, we are listing some of those for 6L6 and 807s from the A.W.V. valve data books, 6L6G is a glass envelope equivalent of the 6L6.

* 6 Adrian Street, Colac, Vic., 3250.

Type 6L6

Single Valve—Class A

Plate voltage	250 v.
Screen voltage	250 v.
Grid voltage	-14 v.
Peak a.f. grid voltage	14 v.
Zero signal plate current	72 mA.
Max. signal plate current	79 mA.
Zero signal screen current	5 mA.
Max. signal screen current	7.3 mA.
Load resistance (pl. to pl.)	2500 ohms
Max. signal power output	6.5 watts
Total harmonic distortion	10%

This valve is a tetrode and under class A operation there is a slight change in plate current. Grid current does not flow, however plate current flows at all times.

Note that there is a very high total harmonic distortion.

Let us compare what happens if two 6L6 valves are operated in class A push-pull for the same plate and screen voltages (for two valves).

Plate voltage	250 v.
Screen voltage	250 v.
Grid voltage	-16 v.
Peak grid to grid voltage	32 v.
Zero signal plate current	120 mA.
Max. signal plate current	140 mA.
Zero signal screen current	10 mA.
Max. signal screen current	16 mA.
Load resistance (pl. to pl.)	5000 ohms
Max. signal power output	14.5 watts
Total harmonic distortion	2%

Comparison of these two sets of data shows that the push-pull connection gives more than twice the output of a single valve, also that the total distortion has dropped to 2%.

By increasing both the plate and screen voltages as well as the grid bias, it is possible to operate two 6L6s in class AB1 push-pull and keep within the maximum ratings for the valves.

Here is one set of data for two valves.

Class AB1

Plate voltage	360 v.
Screen voltage	270 v.
Grid bias voltage	-22.5 v.
Peak a.f. grid to grid	45 v.
Zero signal plate current	88 mA.
Max. signal plate current	132 mA.
Zero signal screen current	5 mA.
Max. signal screen current	15 mA.
Load resistance (pl. to pl.)	6000 ohms
Max. signal power output	26.5 watts
Total harmonic distortion	2%

For this mode of operation there has been almost twice the power output as obtained from the same valves in class A push-pull, and the total harmonic distortion has remained the same. However, it must be pointed out that there is considerable variation in plate current and the screen voltage should be stabilised to keep it at 270 volts. Also, the regulation of the power supply must be very good to keep the h.t. voltage constant as the plate current swings from 88 mA. to 132 mA.

Grid current. Note that in all the examples given so far the peak grid exciting voltage does not exceed the bias voltage on either positive or negative peaks, hence grid current does not flow, nor is the valve driven beyond plate current cut-off.

Class AB2

Plate voltage	360	400 v.
Screen voltage	270	300 v.
Grid bias voltage	-22.5	-25 v.
Peak a.f. g.-g. voltage	72	80 v.
Zero sig. plate current	88	102 mA.
Max. sig. plate current	205	230 mA.
Zero sig. screen current	5	5 mA.
Max. sig. screen curr't	11	20 mA.
Load resistance (plate to plate)	3800	3800 ohms
Max. sig. power output	47	60 watts
Total harm. distortion	2%	—
Peak grid pow. input	270	350 mW.

Two sets of operating conditions have been given. In the first set of data (A.W.V.) the major change from class AB1 operation is in the plate to plate load resistance. However, the grids are now driven into grid current on the positive peaks of the exciting grid voltage and as a result considerably more plate current flows.

However, there are penalties to be made good. The grids require 270 milli-watts of driving power, which means that the driver stage must have good regulation as it supplies this power. Also, the regulation of the plate and screen supplies must be very good.

The second set of data (R.C.A.) shows that with an increase in plate, screen and grid bias voltages and an increase in grid driving power up to 60 watts output can be obtained. However, no distortion figures are quoted.

It would appear that 47 watts output is the maximum that two 6L6 valves can deliver in class AB2 push-pull operation. Above this there is great danger of internal breakdown in the valves.

However, the 807 is essentially a 6L6 valve with different external appearance. The plate is brought out to a metal cap on the top of its glass envelope and the base uses a "low loss" UY configuration.

For Continuous Commercial Service (C.C.S.) the 807 may be operated with

the same ratings as for the 6L6, but for Intermittent Commercial and Amateur Service (I.C.A.S.) it is possible to get as much as 120 watts from two 807s in class AB2 push-pull operation.

No data is available for 6L6 or 807 valves for operation as class B audio frequency amplifiers.

All the data presented so far shows that class A operation is the least efficient, although the simplest, and that to obtain greater power from a specific valve it is necessary to use more than one valve in one of the other classes or several valves in parallel.

It is possible to operate in class A, AB1, AB2 and B so that the distortion in the output wave is very low, but the power output, too, will be low, also there is an enormous difference in the linearity between input and output wave forms for different types of valves.

Important.—It must be thoroughly understood that data in valve handbooks refers to an ideal amplifier and such things as power output and distortion are those to be obtained at the valve or valves' plates. The output coupling device is not considered so in designing amplifiers the losses and any distortion in the coupling system must be taken into account.

It is possible to build valve amplifiers with nominally 1% total harmonic distortion and this can be reduced further if negative feedback is employed.

(to be continued)

N.Z.C.—NEW ZEALAND COUNTIES ARD

Initial award requires confirmations from 20 different New Zealand counties. Stickers for full 40, 60, 80, 100 with a special award for the full 120 counties. Charges: initial certificate with any endorsements, 25 cents or four IRCs; later endorsements 10 cents or two IRCs. Checking sheets with all county information available for 10 cents or two IRCs. This sheet remains a complete record of the counties worked and endorsements obtained—it is returned after each application. Applications and information from ZLXG, 152 Lytton Rd., Gisborne, N.Z.

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AUSTRALIAN DX CENTURY CLUB AWARD

OBJECTS

1. This Award was created in order to stimulate interest in working DX in Australia and to give successful applicants some tangible recognition of their achievements.
2. This Award, to be known as the "DX Century Club" Award, will be issued to any Australian Amateur who satisfies the following conditions.
3. A certificate of the Award will be issued to the applicants who show proof of having contacted one hundred countries, and will be endorsed as necessary, for contacts made using only one type of emission.

REQUIREMENTS

- 2.1 Verifications are required from one hundred different countries as shown in the Official Countries List.
- 2.2 The Official Countries List will be published annually in "Amateur Radio" and will be amended from time to time as required. Should a country be deleted from the Countries List at any time, members and intending members will be credited with such country if the date of contact was before such deletion.
- 2.3 The commencing date for the Award is 1st January 1946. All contacts made on or after this date may be included.

OPERATION

- 3.1 Contacts must be made in the H.F. Band (Band 7) which extends from 3 to 30 MHz, but such contacts must only be made in the authorised Amateur Bands in Band 7.
- 3.2 All contacts must be two-way contacts on the same band. Cross-band contacts will not be allowed.
- 3.3 Contacts may be made using any authorised type of emission for the band concerned.

- 3.4 Credit may only be claimed for contacts with stations using regularly-assigned Government call signs for the country concerned.

- 3.5 Contacts made with ship or aircraft stations will not be allowed, but land-mobile stations may be claimed provided their specific location at the time of contact is clearly shown on the verification.

- 3.6 All stations must be contacted from the same call area by the applicant (except as below), although if the applicant's call sign is subsequently changed, contacts will be allowed under the new call sign providing the applicant is still in the same call area.

If the applicant moves to another call area, contacts must be made from within a radius of 150 miles of the previous location to qualify for award purposes. If the distance of the new location from the old exceeds a radius of 150 miles, a separate application for a new award must be made claiming only contacts made from the new location.

- 3.7 All contacts must be made when operating in accordance with the Regulations laid down in the "Handbook for the Guidance of Operators of Amateur Wireless Stations" or its successor.

VERIFICATIONS

- 4.1 It will be necessary for the applicant to produce verifications in the form of QSL cards or other written evidence showing that two-way contacts have taken place.
- 4.2 Each verification submitted must be exactly as received from the station contacted, and altered or forged verifications will be grounds for disqualification of the applicant.

- 4.3 Each verification submitted must show the date and time of contact, type of emission and frequency band used, the report and the location or address of the station at the time of contact.

- 4.4 A check list must accompany every application setting out the details for each claimed station in accordance with the details required in Rule 4.3.

APPLICATIONS

- 5.1 Applications for membership shall be addressed to the Federal Awards Manager, W.I.A., P.O. Box 67, East Melbourne, Vic. 3002, accompanied by the verifications and check list with sufficient postage enclosed for their return to the applicant, registration being included if desired.

- 5.2 A nominal charge of 25c, which shall also be forwarded with the application, will be made for the issue of the certificate to successful applicants who are non-members of the Wireless Institute of Australia.

- 5.3 Successful applicants will be listed periodically in "Amateur Radio". Members of the D.X.C.C. wishing to have their verified country totals, over and above the one hundred necessary for membership, listed will notify these totals to the Federal Awards Manager.

- 5.4 In all cases of dispute, the decision of the Federal Awards Manager and two officers of the Federal Executive of the W.I.A. in the interpretation and application of these Rules shall be final and binding.

- 5.5 Notwithstanding anything to the contrary in these Rules, the Federal Council of the W.I.A. reserves the right to amend them when necessary.

AUSTRALIAN V.F.F. CENTURY CLUB AWARD

OBJECTS

1. This Award has been created in order to stimulate interest in the V.F.F. bands in Australia, and to give successful applicants some tangible recognition of their achievements.
2. This Award, to be known as the "V.F.F. Century Club" Award, will be issued to any Australian Amateur who satisfies the following conditions.
3. Certificates of the Award will be issued to the applicants who show proof of having made one hundred contacts in the V.F.F. bands, and will be endorsed as necessary, for contacts made using only one type of emission.

REQUIREMENTS

- 2.1 Contacts must be made in the V.F.F. Band (Band 8) which extends from 30 to 300 MHz, but such contacts must only be made in the authorised Amateur Bands in Band 8.
- 2.2 In the case of the authorised bands between 20 and 100 MHz, verifications are required from one hundred different stations at least seventy of which must be Australian. The Amateur Bands 20 to 34 MHz, and 56 to 60 MHz, will be counted as one band for the purposes of the Award.
- 2.3 In the case of the authorised Amateur Band between 100 to 200 MHz, verifications from one hundred different stations are required.
- 2.4 It is possible under these rules for one applicant to receive two certificates, one for each of the authorised Amateur Bands nominated in Rules 2.2 and 2.3.
- 2.5 The commencing date for the Award is 1st June 1948. All contacts made on or after this date may be included.

OPERATION

- 3.1 All contacts must be two-way contacts on the same band, and cross-band contacts will not be allowed.
- 3.2 Contacts may be made using any authorised type of emission for the band concerned.

- 3.3 Fixed stations may contact portable/mobile stations and vice versa, but portable/mobile station applicants must make their contacts from within the same call area.

- 3.4 Applicants, when operating either portable/mobile or fixed, may contact the same station licensee, but may not include both contacts for the same type of endorsement.

- 3.5 Applicants may only count one contact for a station worked as a limited licensee with a Z call sign who is subsequently contacted as a full A.O.C.P. holder.

- 3.6 All stations must be contacted from the same call area by the applicant (except as below), although if the applicant's call sign is subsequently changed, contacts will be allowed under the new call sign providing the applicant is still in the same call area.

If the applicant moves to another call area, contacts must be made from within a radius of 150 miles of the previous location to qualify for award purposes. If the distance of the new location from the old exceeds a radius of 150 miles, a separate application for a new award must be made claiming only contacts made from the new location.

- 3.7 All contacts must be made when operating in accordance with the Regulations laid down in the "Handbook for the Guidance of Operators of Amateur Wireless Stations" or its successor.

VERIFICATIONS

- 4.1 It will be necessary for the applicant to produce verifications in the form of QSL cards or other written evidence showing that two-way contacts have taken place.
- 4.2 Each verification submitted must be exactly as received from the station contacted, and altered or forged verifications will be grounds for disqualification of the applicant.
- 4.3 Each verification submitted must show the date and time of contact, type of emission and frequency band used, the report and the location or address of the station at the time of contact.

- 4.4 A check list must accompany every application setting out the following details:—

- 4.4.1 Applicant's name and call sign, and whether a member of the W.I.A. or not.

- 4.4.2 Band for which application is made, and whether special endorsement is involved.

- 4.4.3 Where applicable, the date of change of call sign and previous call sign.

- 4.4.4 Details of each contact as required by Rule 4.3.

- 4.4.5 The applicant's location at the time of each contact if portable/mobile operation is involved.

- 4.4.6 Any relevant details of any contact about which some doubt might exist.

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- 5.5 Notwithstanding anything to the contrary in these Rules, the Federal Council of the W.I.A. reserves the right to amend them when necessary.

AUSTRALIAN D.X.C.C. COUNTRIES LIST

	Phone	C.W.		Phone	C.W.
A2C, ZS9—Botswana	FR7—Tromelin	.....	.....
AC3—Sikkim	FS7—Saint Martin	.....	.....
AC4—Tibet	FW8—Wallis and Futuna Is.	.....	.....
AC5—Bhutan	FY7—French Guiana and Inini	.....	.....
AP—East Pakistan	G, GB—England	.....	.....
AP—West Pakistan	GC—Guernsey and Dependencies	.....	.....
BV—Taiwan	GC—Jersey Is.	.....	.....
BY—China	GD—Isle of Man	.....	.....
C21, VK9—Nauru	GI—Northern Ireland	.....	.....
C31, PX—Andorra	GM—Scotland	.....	.....
CE—Chile	GW—Wales	.....	.....
CE9AA-AM, FB8Y, KC4AA-US, LA,	HA, HG—Hungary	.....	.....
LU-Z, OR, UA1, VK0, VP8, ZL5,	HB9—Switzerland	.....	.....
8J—Antarctica	HB0—Liechtenstein	.....	.....
CE0A—Easter Is.	HC—Ecuador	.....	.....
CE0X—San Felix	HC8—Galapagos Is.	.....	.....
CE0Z—Juan Fernandez	HH—Haiti	.....	.....
CM, CO—Cuba	HI—Dominican Republic	.....	.....
CN—Morocco	HK—Columbia	.....	.....
CP—Bolivia	HK0—Bajo Nuevo	.....	.....
CR3—Portuguese Guinea	HK0—Malpelo Is.	.....	.....
CR4—Cape Verde Is.	HK0—San Andres and Providencia	.....	.....
CR5—Principe, Sao Thome	HL, HM—Korea	.....	.....
CR6—Angola	HP—Panama	.....	.....
CR7—Mozambique	HR—Honduras	.....	.....
CR8—Portuguese Timor	HS—Thailand	.....	.....
CR9—Macao	HV—Vatican	.....	.....
CT1—Portugal	HZ, 7Z—Saudi Arabia	.....	.....
CT2—Azores	I, IT—Italy	.....	.....
CT3—Madeira	IS1—Sardinia	.....	.....
CX—Uruguay	JA, JH, JR, KA—Japan	.....	.....
DJ, DK, DL, DM—Germany	JDI, KA1, KG6I—Bonin and Volcano Is.	.....	.....
DU—Philippine Is.	JDI, KA1, KG6I—Marcus Is.	.....	.....
EA—Spain	JT—Mongolia	.....	.....
EA6—Balearic Is.	JW—Svalbard	.....	.....
EA8—Canary Is.	JX—Jan Mayen	.....	.....
EA9—Rio de Oro	JY—Jordan	.....	.....
EA9—Spanish Morocco	K, KN, W, WA, WB, WN—United States	.....	.....
EI—Republic of Ireland	of America	.....	.....
EL—Liberia	KB6—Baker, Howland and American	.....	.....
EP—Iran	Phoenix Is.	.....	.....
ET3—Ethiopia	KC4—Navassa Is.	.....	.....
F—France	KC6—Eastern Caroline Is.	.....	.....
FB8W—Crozet Is.	KC6—Western Caroline Is.	.....	.....
FB8Z—Kerguelen Is.	KG4—Guantanamo Bay	.....	.....
FB8Z—Amsterdam and St. Paul Is.	KG6—Guam	.....	.....
FC—Corsica	KG6—Mariana Is.	.....	.....
FG7—Guadeloupe	KH6, WH6—Hawaiian Is.	.....	.....
FH8—Comoro Is.	KH6—Kure Is.	.....	.....
FK8—New Caledonia	KJ6—Johnston Is.	.....	.....
FL8—French Somaliland	KL7, WL7—Alaska	.....	.....
FM7—Martinique	KM6—Midway Is.	.....	.....
FO8—Clipperton Is.	KP4, WP4—Puerto Rico	.....	.....
FO8—French Oceania	KP6—Palmyra Group, Jarvis Is.	.....	.....
FO8M—Maria Theresa	KR6, 8—Ryuku Is.	.....	.....
FP8—St. Pierre and Miquelon	KS4—Swan Is.	.....	.....
FR7—Glorioso Is.	KS4B, HK0—Serrana Bank and Ron-	.....	.....
FR7—Juan de Nova	cador Cay	.....	.....
FR7—Reunion Is.	KS6—American Samoa	.....	.....

	Phone	C.W.
KV4, WV4—Virgin Is.		
KW6—Wake Is.		
KX6—Marshall Is.		
KZ5—Canal Zone		
LA, LJ—Norway		
LU—Argentina		
LX—Luxembourg		
LZ—Bulgaria		
MP4B—Bahrein		
MP4D, T—Trucial Oman		
MP4M—Sultanate of Muscat and Oman		
MP4Q—Qatar		
OA—Peru		
OD5—Lebanon		
OE—Austria		
OH—Finland		
OH0—Aland Is.		
OJ0—Market Reef		
OK, OL—Czechoslovakia		
ON—Belgium		
OX, KG1, XP—Greenland		
OY—Faroe Is.		
OZ—Denmark		
PA, PE, PI—Netherlands		
PJ—Netherlands Antilles		
PJ—Sint Maarten		
PY—Brazil		
PY0—Fernando de Noronha		
PY0—St. Peter and St. Paul's Rocks		
PY0—Trinidad and Martin Vaz Is.		
PZ1—Surinam		
SK, SL, SM—Sweden		
SP—Poland		
ST—Sudan		
SU—Egypt		
SV—Crete		
SV—Dodecanese		
SV—Greece		
TA, TC—Turkey		
TF—Iceland		
TG—Guatemala		
TI—Costa Rica		
TJ—Cocos Is.		
TI—Cameroun		
TI—Central African Republic		
TN—Congo Republic		
TR—Gabon Republic		
TT—Chad Republic		
TU—Ivory Coast		
TY—Dahomey Republic		
TZ—Mali Republic		
UA, UV, UW1-6, UN1—European Russian S.F.S.R.		
UA, UV, UW9, 0—Asiatic R.S.F.S.R.		
UA1—Franz Josef Land		
UA2—Kaliningradsk		
UB5, UT5, UY5—Ukraine		
UC2—White Russian S.S.R.		
UD6—Azerbaijan		
UF8—Georgia		
UG6—Armenia		
UH8—Turkoman		
UI8—Uzbek		

	Phone	C.W.
UJ8—Tadzhik		
UL7—Kazakh		
UM8—Kirghiz		
UO5—Moldavia		
UP2—Lithuania		
UQ2—Latvia		
UR2—Estonia		
VE, VO—Canada		
VK—Australia		
VK2—Lord Howe Is.		
VK4—Willis Is.		
VK9—Christmas Is.		
VK9—Cocos Is.		
VK9—Norfolk Is.		
VK9—Papua Territory		
VK9—Territory of New Guinea		
VK0—Heard Is.		
VK0—Macquarie Is.		
VP1—British Honduras		
VP2A—Antigua, Barbuda		
VP2D—Dominica		
VP2E—Anguilla		
VP2G—Grenada and Dependencies		
VP2K—St. Kitts, Nevis		
VP2L—St. Lucia		
VP2M—Montserrat		
VP2S—St. Vincent and Dependencies		
VP2V—British Virgin Is.		
VP5—Turks and Caicos Is.		
VP7—Bahama Is.		
VP8—Falkland Is.		
VP8, LU-Z—South Georgia Is.		
VP8, LU-Z—South Orkney Is.		
VP8, LU-Z—South Sandwich Is.		
VP8, LU-Z, CE9AN-AZ—South Shetland Is.		
VP9—Bermuda Is.		
VQ1—Zanzibar		
VQ9—Aldabra Is.		
VQ9—Chagos Is.		
VQ9—Desroches		
VQ9—Farquhar		
VQ9—Seychelles		
VR1—British Phoenix Is.		
VR1—Gilbert, Ellice and Ocean Is.		
VR2—Fiji Is.		
VR3—Fanning and Christmas Is.		
VR4—Solomon Is.		
VR5—Tonga Is.		
VR6—Pitcairn Is.		
VS5—Brunei		
VS6—Hong Kong		
VS9K—Kamran Is.		
VU—India		
VU—Laccadive Is.		
VU—Andaman and Nicobar Is.		
XE, XF—Mexico		
XF4—Revilla Gigedo		
XT2—Volta Republic		
XU—Cambodia		
XW8—Laos		
XZ2—Burma		
YA—Afghanistan		

[illegible]

	Phone	C.W.
7X, FA—Algeria		
8P—Barbados		
8QA, VS9M—Maldive Is.		
8R—Guyana		
8Z4—Saudi Arabia/Iraq Neutral Zone		
9A1, M1—San Marino		
9G1—Ghana		
9H1—Malta		
9J—Zambia		
9K2—Kuwait		
9K3, 8Z3—Kuwait/Saudi Arabia Neutral Zone		
9L1—Sierra Leone		
9M2, 4—Western Malaysia (fr. 16/9/63)		
9M6, 8—Eastern Malaysia (fr. 16/9/63)		
9N1—Nepal		
9Q5—Republic of the Congo		
9U5—Burundi		
9V1, VS1, 9M4—Singapore (prior to 16/9/63 or after 8/8/65 only. From 16/9/63 to 8/8/65 Singapore counts as 9M2—West Malaysia)		
9X5—Rwanda		
9Y4—Trinidad and Tobago		
*—Blenheim Reef		
*—Geyser Reef		

* Since there is no apparent claim by any country to these reefs, no prefix will be shown. Confirmations for contact only after 4/5/67 will be accepted for D.X.C.C. credit.

DELETED COUNTRIES LIST

	Phone	C.W.
C9—Manchuria (prior 16/9/63)
CN2—Tangier (prior 1/7/60)
CR8—Damao, Diu (prior 1/1/62)
CR8—Goa (prior 1/1/62)
EA9—Ifrni (prior 13/5/69)
ET2—Eritrea (prior 15/11/62)
F78—French West Africa (pr. 7/8/60)
F18—French Indo China (pr. 21/12/50)
FN—French India (prior 1/11/54)
FQ8—French Equ. Africa (pr. 17/8/60)
I1—Trieste (prior 1/4/57)
I5—Italian Somaliland (prior 1/7/60)
JZ0—Nether. New Guinea (pr. 1/5/63)
PK1, 2, 3—Java (prior 1/5/63)
PK4—Sumatra (prior 1/5/63)
PK5—Netherlands Borneo (pr. 1/5/63)
PK6—Celebes & Moluc. Is. (pr. 1/5/63)
UN1—Karelo-Finnish Rep. (pr. 1/7/60)
VO—Newfoundland (prior 1/4/49)
VQ6—Brit. Somaliland (prior 1/7/60)
VS4—Sarawak (prior 16/9/63)
VS9H—Kuria Muria Is. (pr. 29/11/67)
ZC5—Brit. North Borneo (pr. 16/9/63)
ZC8—Palestine (prior 2/7/68)
ZD4—Gold Coast, Togo'd (pr. 6/3/57)
9M2—Malaya (prior 16/9/63)
9S4—Saar (prior 1/4/57)
9U5—Ruanda-Urundi (between 1/7/60 and 1/7/62 only)

AMSAT 1970 ANNUAL REPORT

By DR. PERRY J. KLEIN,* K3JTE, President

On March 3, AMSAT reached its first anniversary incorporation and entered its second year of activity. Membership grew from 264 members and 11 member clubs on January 1, 1970, to over 370 members and 28 member clubs in 25 countries. The following comprises the second annual report presented at the AMSAT annual meeting, held on November 21, 1970.

ACCOMPLISHMENTS TO DATE

AUSTRALS OSCAR B

This first full year of AMSAT's operation witnessed the launch of the fifth Radio Amateur satellite of the Oscar series, *Australs Oscar B* (AO-5), built by the WIA Project. *Australs* group in Australia, was launched from the Western Test Range, Calif., on Jan. 23, 1970. The spacecraft's two metre beacon transmitter operated for 23 days and its commandable ten metre beacon transmitter reached end of life after 48 days.

The AO-5 mission was technologically significant in several respects. Of particular significance was the command system which was used to control the operation of the ten metre beacon. Commands were successfully transmitted by amateur radio stations in the United States, marking the first time that successful operation of a command system has been demonstrated in a satellite in the Amateur Service.

The passive magnetic attitude stabilization system employed in AO-5 was also of great significance. The bar magnet and eddy-current damper brought one axis of the spacecraft into alignment with the earth's magnetic field within a week after launch. The two-axis isolation was indicative of the effectiveness of this method of reducing the spin in Amateur satellites.

AO-5 was the first satellite in the Amateur Service to transmit in an HF Amateur band. Many reception reports of the 29.45 MHz ten metre beacon were received from Australia and S.W.'s using simple long-wire or dipole antennas. Reports of skip propagation and sporadic reception were reported by a number of observers.

Reports were received from several hundred stations in at least 27 countries, including the Soviet Union. All telemetry reports were forwarded to WIA Project *Australs* in Melbourne for processing and QSL acknowledgment. Reports from I.A.R.U. Region 1 amateurs were collected and handled by Bill Browning, G2AOX, Region 1 Oscar Co-ordinator.

The results of the AO-5 project are contained in the "AO-5 Summary Report" submitted June 9 to the FCC and NASA, and reprinted in the June 1970 issue of the "AMSAT Newsletter". Two other reports, one detailing the propagation results and the other dealing with the spacecraft telemetry results were also submitted to FCC and NASA, and appear in the October and December 1970 issues of "QST," respectively.

ATS-3 EXPERIMENTAL PROPOSAL

In November 1969, AMSAT submitted a proposal to NASA to provide two amateur experimental satellites. The first, the Technology Satellite G (ATS-G) synchronous satellite. This 83-page formal document proposed an orbital station and a ATS-G synchronous "stationary" orbit.

At NASA's request, an addendum to the proposal was prepared and submitted on January 7, 1970, dealing with the choice of frequency bands proposed and the question of the possibility of interference to and from other stations. The addendum was accepted by invitation. AMSAT gave an oral presentation of the proposal before a NASA advisory committee evaluating the ATS-G experiments.

WORLD ADMINISTRATIVE RADIO CONFERENCE PREPARATIONS

In preparing for the June 1971 World Administrative Radio Conference on Space Matters, which will be dealing with the allocation of frequencies for Amateur satellites, AMSAT

prepared two documents for the ITU's International Radio Consultative Committee (CCIR). One is a report entitled "Technical Feasibility of Frequency Sharing in the Amateur Radio Service" when using Space Communication Techniques," and the other is a recommendation on the same subject. Both documents were approved by the U.S. CCIR National Committee for forwarding to the other ITU member countries. AMSAT also assisted the ARRL in preparing material to the FCC on frequency requirements for future Amateur satellites. The text of one filing to the Commission is reprinted in the August issue of "QST".

AMSAT ADDRESSES AND PRESENTATIONS

In conjunction with the 1970 ARRL National Convention held in Boston, Sept. 25-27, AMSAT sponsored the first Radio Amateur Satellite Conference, with sessions presenting the results of AO-5 and playing a major role in the AO-5 Addresses were given at several other Amateur gatherings, including the Dayton Hamvention, the Roanoke Division Convention, the Syracuse, Territory and Central States Society conventions, and a number of radio club meetings. An AMSAT paper entitled "Radio Amateur Satellite for Education and Research" was presented at the 1970 IEEE Electronics and Aerospace Systems Conference held in Washington in October.

CURRENT ACTIVITY—AMSAT-OSCAR B

Work is proceeding on AMSAT-Oscar B (AO-6), the first of a series of long lifetime Amateur communications satellites designed for launch as secondary payloads on Thor-Delta or Agena missions. A detailed specifications document on this series of spacecraft was prepared in April and is expected as guidance material for the development of the first test set in developing experiments for these satellites. There are now several experiments under

A four-channel, channelised, hard-limiting FM repeater is being breadboarded by members of WIA Project *Australs* who will be involved in the construction of *Australs Oscar 5*. The repeater is of the demodulation-remodulation type and employs a frequency of approximately 144 MHz for uplink and 432.1 MHz for the downlink, with a satellite transmitter power output of one watt per channel.

A linear repeater with a bandwidth of 80 KHz is under construction by the Euro-Oscar group in Marbach, West Germany. This repeater has an input frequency of 432.1 MHz, and an output frequency of 145.9 MHz, with a satellite transmitter power output of ten watts. The repeater is designed for use with SSB, CW, AM, FM, RTTY or SSTV, with as many stations as can fit within its 50 KHz passband.

Also being breadboarded is a linear repeater under construction by AMSAT members in the United States. This repeater has an input frequency of 144 MHz for uplink and an output frequency around 29.8 MHz, with a satellite transmitter power output of two watts. This repeater is designed for use with any method of modulation permitted in these two bands.

The WIA Project *Australs* group has developed an Oscar telemetry encoder which transmits telemetered satellite parameters directly in 850 Hz audio frequency-shift keyed (FSK) format for use with an ordinary 69 w.p.m. teleprinter. Any station having a tape recorder will be able to send or receive the recorded data directly to the project headquarters for computer processing, or they may decode the telemetry data themselves using calibration information which will be made available to the project.

John Good, W5CAY, has designed and breadboarded an Oscar telemetry encoder which transmits satellite parameters directly as numbers in Morse Code, so that only pencil, paper and calibration information are needed for reception and interpretation of data from the satellite.

A breadboard of a command encoder capable of providing up to 35 separate command functions has been completed by WIA Project *Australs* group. The command encoder is designed to provide a reliable and secure means of controlling the operation of the satellites to minimise any possibility of interference.

Several panels of solar cells left over from NASA and ESSA satellite programmes have been made available for use in the AO-6 series of satellites. Several of these panels are being reconfigured for use in AO-6. Rechargeable nickel-cadmium batteries have also been made available and have been undergoing charge/discharge cycle testing under simulated satellite power loads. The solar cells and rechargeable batteries are expected to make possible satellite operating lifetimes in excess of one year.

Following designs prepared by AMSAT's AO-6 Project Manager, Jan King, W9JBY, the AO-6 internal structural assembly and experiment modules have been fabricated at the facilities of W2QJT in Ithaca, New York. This is actual flight hardware, and represents the beginning of construction of the AO-6 spacecraft.

An AMSAT proposal to NASA for the launch of AMSAT-Oscar-B was submitted in August and an oral presentation was given in November. Much of the AO-6 description and justification material included in the proposal was reprinted in the Sept. issue of the "AMSAT Newsletter".

In connection with the AO-6 satellite project, a third-party agreement has been arranged between Australia and the United States to permit the exchange of third-party Amateur communications experiments. This agreement extends the previous AO-5 third-party agreement arranged last year until several months after the end of life of Oscar 6.

FUTURE ACTIVITY

AMSAT is giving highest priority to the development of long-lifetime, solar-powered Oscar satellites that can be used regularly and extensively for a wide range of experiments, particularly on the VHF Amateur bands. Thus it is planned that the satellites to come, beginning with AO-6, will open the door to the international use of Amateur satellites as an additional mode of communications for Amateur Radio.

☆

CHANGE IN INTRUDER WATCH CO-ORDINATOR IN N.S.W.

Bill Jenvey, VK3ZO, has been appointed Intruder Watch Co-ordinator for New South Wales in place of Ross Treloar, who has been forced to retire due to overseas work commitments.

Bill Jenvey's (VK3ZO) address is 8 Forsyth Street, Willoughby, N.S.W., 2068.

A & R-SOANOR 25th ANNIVERSARY

Now one of Australia's leading components and equipment manufacturers and distributors, the A & R-Soanor Group of Companies are currently celebrating 25 years in business.

During the last five years, A & R diversified their manufacturing activities by developing a range of electronic and electrical equipment, specialising in power supplies for communications, educational and laboratory apparatus, and consumer electronic products.

A variety of air-cooled transformers from sub-miniature to 10kva. have been developed as ex-stock items.

The scope of activity by the Group runs into many millions of dollars a year, with offices in three States, employing approximately 200 people in the manufacture and merchandising of equipment, transformers and components; with the consolidation of offices and the reduction of overheads now embrace over 35,000 square feet of space.

A continual research and development programme involving two groups, transformers and equipment, are all part of overall plans for further expansion to keep pace with industry and to meet future requirements from industrial, consumer and government departments.

By early 1971, a Tokyo office will be established to meet the needs of the Japanese Electronics and to provide improved availability of capacitors, resistors and other components.

The A & R-Soanor Group, with 25 years operational success behind them, look forward to the next 25 years with excitement and optimism, a part of Australia's fastest growing industry.

*P.O. Box 27, Washington, D.C., 20044, U.S.A.

THE CALL BOOK

The 1971 issue of the Call Book is now in the course of preparation. The schedule we are working to means that the book will be available some time during April, and will include all alterations and additions as notified to us by the F.M.G.'s Department up to and including the December 1970 lists.

In previous years, we have received some severe criticism over errors that have appeared in the Call Book, but our experience has shown that the errors which have occurred have been due to the fact that many licensees have failed to notify the Department when there has been a change of address, despite the fact that any such change of station location can (according to the regulations) only be made with the permission of the Department. The fact that this regulation is not strictly enforced in no way relieves the licensee of his responsibility of making sure that his address is correctly advised to the proper authorities.

In an endeavour to produce the most up-to-date Call Book possible, we will notify the Department of any changes of address of which we are aware, but have not appeared in any official Departmental lists up to December 1970.

LICENSED AMATEURS IN VK AT AUGUST 1970

	Full	Limited	Total
VK0	7	0	7
VK1	83	28	111
VK2	1401	457	1858
VK3	1294	635	1929
VK4	527	194	721
VK5	516	233	749
VK6	356	140	496
VK7	160	72	232
VK8	31	10	41
VK9	84	8	92
	4459	1777	6236
			Grand Total

Results of 432 MHz. Aerial Gain Contest

(continued from page 10)

COLINEAR DESIGN

The two antennas exhibiting highest gain (15 and 16 dB. respectively) were 32 element extended-expanded collinear. These antennas originated in the San Francisco Bay area of California and have become increasingly popular in the United States. The lengths of the driven elements are extended to 5/8 of a wavelength and the spacing between parallel elements expanded to 3/4 of a wavelength. In conventional collinear these dimensions are both 1/2 wavelength. The detailed dimensions are given in Fig. 2.

YAGI DESIGN

The most successful yagi (11 dB.) was based on the highly reputed VK3ABP design, the dimensions of which are given in Fig. 3.

CONCLUSION

It is expected that the antenna gain measurement will become an annual event, thus providing Amateurs in the Eastern States with a means of evaluating their antennas and determining trends in antenna design.



Brian Armstrong, G3EDD, Executive Vice-President of R.S.G.B. recently visited Melbourne. Les Jenkins, VK3ZBJ, Project Manager of W.I.A. Project Australis Group, is showing Brian a 432 MHz. transceiver. On the left is W.I.A. Federal President Michael Owen, VK3KI.

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W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. Position in the list is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total D.X.C.C. credits given, including deleted countries. Where totals are the same, listings will be alphabetical by call sign.

Credits for new members and those whose totals have been amended are also shown.

PHONE

VK5MS	319/343	VK5AB	297/314
VK6RU	317/342	VK4FJ	287/397
VK4HR	315/332	VK4TY	284/288
VK3AHO	311/326	VK2APK	281/287
VK6MK	304/324	VK2AAK	272/277
VK4KS	300/315	VK3TL	271/277

Amendments:

VK4PX	251/252	VK3JW	224/225
VK3AMK	227/227	VK4RF	192/192

Correction:

VK2AMU shown in the Nov. 1970 list as Cert. No. 113, should read Cert. No. 114.

C.W.

VK2QL	305/326	VK3YL	279/296
VK3AHO	301/315	VK2BN	274/299
VK4FJ	290/315	VK3XB	270/287
VK4HR	289/311	VK3ARX	270/279
VK3AGH	282/286	VK6RU	268/289
VK2APK	280/288	VK4TY	259/272

Amendments:

VK4RF	169/181	VK4PX	107/111
-------	---------	-------	---------

OPEN

VK6RU	318/343	VK6MK	304/324
VK4HR	316/341	VK2EO	302/325
VK3AGH	314/334	VK4KS	301/325
VK3JW	310/329	VK2APK	298/309
VK4SD	306/321	VK4FJ	298/323
VK4TY	306/321	VK3ARX	297/306

Amendments:

VK4PX	263/268	VK6HD	191/191
VK4RF	235/247		

New Member:

Cert. No.	Call	Total
130	VK5JK	129/136

AUGUST 1970

VK3YEH—S. Hyne, 11/74 Auburn Rd., Hawthorn, 3122.

VK9TM—A. A. Morgan, Macquarie Island.

VR3ADD—H. L. Dahlen. Now VR15A.

COOK BI-CENTENARY AWARD

Correction: Certificate No. 887 shown on the previous list as W3YOR should read Cert. No. 887 WASTGU.

☆

A comprehensive programme is now being prepared and will be sent to you on receipt of your enquiry—either by post or through any member of the Canberra Radio Society. Accommodation will be limited, please book early to avoid disappointment.

Receipt of your first issue will serve as acknowledgment of your sub. Allow six weeks for delivery.

SO YOU HAVE CHANGED YOUR QTH

For as long back as we can remember, the first page of this magazine has shown details for the procedure to be adopted to correctly ensure that your copy of "A.R." will reach you after a change of address. However, it is becoming more and more apparent that the procedure is not being followed as it should be, many members trying to short-circuit the system by notifying us direct.

Instead of helping, this procedure only delays the change in our records, as we have to refer these changes back to the Division concerned. We now make a plea that the procedure that has been laid down be followed, namely when you have a change of address, notify your Divisional Secretary—NOT US. Your Secretary will include the change in his monthly list to us. He knows when and where to send it.

You can help yourself by making sure to advise your Secretary in plenty of time, and not two or three months

later. The number of copies of "A.R." which are returned to us each month with the endorsement "not known at this address," or similar, is reaching quite a large figure. This is involving us in much extra work and expense, as we have to locate the member concerned and re-post the magazine. We have no way of knowing how many "A.R.s" are delivered although wrongly addressed. May we suggest you check the wrapper from this issue, and if there is any error, notify your Secretary immediately.



AWARDS FOR TECHNICAL ARTICLES

The Publications Committee considered the allocation of these awards at the December meeting, and as a result, awards have been made to Mr. R. H. Black, VK2QZ, Mr. R. F. Dannecker, VK4ZND. The various articles covering "Australis" were also voted into an award, but in view of the number of people involved it was considered im-

practical to try to make a worthwhile award to each and every individual worker on the project. It was, therefore, decided to make the award to the Project Australis Fund.

Our congratulations to the recipients. To the other contributors who just failed to make the grade this year, our thanks, and we hope you will try again.

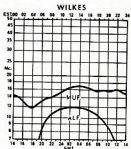
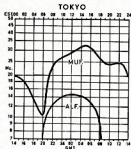
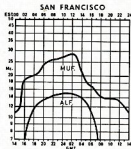
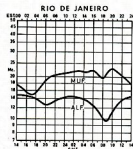
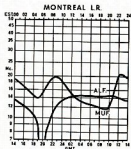
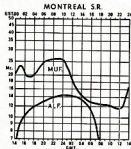
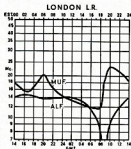
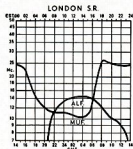
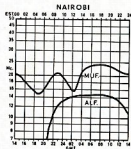
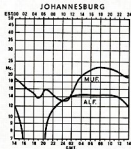
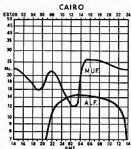
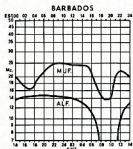


HIGGINBOTHAM AWARD

This year a somewhat unusual result came from the voting for this award. Two previous winners were well up in the voting, and one man almost made it for the third time. The final outcome was to make the award to the VK3 V.h.f. Group in recognition of the large amount of work they have devoted to their projects over the last two years. Once again, the number of individuals concerned was too many to allow awards to each and everyone, hence the award has been made to the Group as a whole, for them to apply as they wish.

PREDICTION CHARTS FOR JANUARY 1971

(Prediction Charts by courtesy of Ionospheric Prediction Service)





Sub-Editor: ERIC JAMIESON, VK5LP
Forrester, South Australia, 5233.

Closing date for copy 30th of month.
All Times in E.S.T.

AMATEUR BAND BEACONS

VK4 144.390 VK4VUV, 107m. W. of Brisbane.
VK5 53.000 VK5VF, Mt. Lofty.
144.400 VK5VU, Mt. Lofty.
VK6 52.005 VK6VF, Tuart Hill.
52.900 VK6TS, Carnarvon.
144.500 VK6VU, Mt. Lofty.
145.000 VK6VF, Tuart Hill.
435.000 VK6VF (on by arrangement).
VK7 144.900 VK7VF, Devonport.
VK8 146.000 VK8XI, Christmas Island.
ZL3 145.000 ZL3VHF, Christchurch.
JA 51.965 JA1GCV, Japan.
W 50.091 W8KAP, U.S.A.
HL 50.100 HL0WI, South Korea.

As of this writing, 6 metres is beginning to warm up in readiness for the DX season. Probably the most important news this month was contained in a message from Bill VK2ZBU who said that he had received a 16 watt beacon W8KAP (see list above) at strength up to 3 x 9 on 8th November between 1300 and 1430. Everything possible was done to try and get a signal back the other way, but frustratingly, no results. No further details of the station were available, and therefore it is not known whether anyone monitors the station during key up periods. JAs were also heard in Sydney at the same time. Around the same time a rumour went around that Eddie VK1VF had worked HL0WI, but since then advice has come through that the station was heard but not worked.

A number of minor 6 metre openings to various States have been noted during November. Such signals will be received from a few VK4s in S.A. (also VIC—Ed.) on Sunday, 29th November. John VK4ZJB/4, operating from a rough shack about VK3 at 10 miles from Brisbane and using his much advertised 10 element yagi, certainly put a rock-crushing signal into this state, and was heard by several stations during peak 6 metre openings. Channel B F.M. on 146 MHz. will be receiving plenty of attention in VK4, so operators throughout the land should be aware of the information again. He will be particularly active on 6 metres frequency, particularly as Channel B is now being used in a big way in Queensland. John further reports that he has been working into Sydney a few weeks ago on Channel B, so the distance is being lengthened considerably. JAs have been scarce in Brisbane for the past few weeks, however, not withstanding. John has now worked more than 500 of them, with 118 confirmations. Not a bad effort!

Last month details were given of operating schedules of Bob VK4AOT, and you are reminded to read the information again. He will be operational on 52, 144, 432, 576 and 1296 MHz. from Mt. Cowley, 80 miles south-west of Melbourne, from 18/12/73 to 1/1/74. If you want telephone contact during that time contact Eric Gray, VK4ZSB on (03) 25-3249 (home) or (03) 650-5613 (business). Bob will be looking for a rough shack about 5 metres west of 432, 432, 576 and 1296 MHz., and on 6 metres between 24th and 30th December with a view to establishing contact on his sporadic E with VK2, 4 and 5 on 2 metres.

There appears to be quite an upsurge in portable and general DX activity this season. From the VK6 V.H.F. News Bulletin comes the following information. Operation is planned by the VK6 DX group, 62GV, from the Albany region on 52 MHz. s.s.b. 32,323 f.m., 52,558 f.m., 144 s.s.b., 146 f.m., also the possibility of inclusion of some 432 MHz. gear. An attempt will be made to work Bob VK4AOT from there. Bob VK6ZFY is planning operation from either Esperance or Hopetown on the 2nd and 3rd January, using 100 watts s.s.b. Percy VK6DD will be operating from Augusta on 52 MHz. a.m., 52,656 f.m. and 146 MHz. f.m. from about 26th December for two weeks, in addition to activity of h.f. bands 80 to 10 metres.

There seems to be no definite portable plans from VK5 during the DX season, other than reports that Wally VK6ZWW and John VK5QZ will be operating from Coober Pedy, South Australia. Of interest to VK5 operators will be Kerry VK5SU at Ceduna, who is a bit more

than half way between Perth and Adelaide. He is probably now operational on both 6 and 2 metres, so keep him in mind in VK6.

The only letter received this month is from Bob VK3AOT (bless him! He never let's me down!). Amongst other matters which have already been included at odd points above, he reports Norm VK3ZUT will be operating from Mt. Matlock, 50 miles north-east of Melbourne from 1st to 3rd January, using a.m. on 52, 144 and 432 MHz. This is also in the Field Day on 3rd January between 1100 and 1600.

In general, it looks as though the DX season, providing conditions are right, could be a real winner this year, the amount of interest being shown is quite exceptional, and with more and more stations getting their equipment in a condition suitable for portable operation, some very interesting contacts could be forthcoming. It is to be hoped various portable and other operators will drop me a line and tell me all about it.

And if you are not completely satisfied with all the above proposed operating, you may be interested to know there is to be a balloon sent up from Mildura some time in February carrying transmitter equipment, input on 146 MHz. f.m., output on 432.7 MHz. f.m. Power output is about 2 watts. The launch is an experiment as part of the Australls project.

A further news item from Bob VK3AOT mentions he has received a letter from Ray VK3ATN with a preliminary announcement to the effect that some time next year he will have his dish antenna and a very large 2 metre antenna available for use. The Group for moon-bounce experiments. Provided any group brings it's own gear, Ray does not mind if they use it. He is also looking for a sign. That's a kind offer Ray, further details will be published later, in the mean time, those likely to be interested might care to contact Ray direct and find out what is proposed.

Keep an ear on 32.157 MHz. each night as Leigh VK6WA beams east at 2000 hours and is looking for contacts. The path to VK3 was open from VK6 on 24th November between 1300 and 1730, so keep those antennas tuned. Finally, on this round up of the DX scene bear in mind the portable operations being undertaken by the South-East Radio Group from the Elbow, 14 miles north-west of Mt. Gambier; they will be operating the club station VK5SR over the New Year holiday weekend and using all bands from 80 metres through to 1396 MHz.

From "Break-In" of N.Z.A.R.T. comes the following paragraph and I quote: "Big Sam ... Again. From a contact with one of the KPs at Adelaide, David VK2RZ has heard of the activities of Sam Harris, KP4BPZ. Maybe Sam lets the grass grow under his 100 foot dish, but he certainly doesn't let it grow under his feet. He has just bought 28 acres in the area near the 1,000-ft. radio telescope and is to make 'some improvements'. He's going to build a 300-foot dish!! Not only will this improve his already devastating signal from the moon, but it will give him a greatly improved sky scan, and a much better chance of making it seem to think that Sam will now be able to acquire stations as far south as Australia and New Zealand. I certainly hope so."

MEET THE OTHER MAN

This month we take a look at the activities of the Australian N.Z.A.R.T. member, Birchip, Victoria, at an elevation of 330 feet, and 200 miles north-west of Melbourne. Ray will probably be best remembered by many for his moon-bounce efforts, particularly with K2MWA/2 in New Jersey, U.S.A. (10,417 miles). For his efforts in this direction he was awarded the 1973 Technical Achievement Award 1967, and is the only non-American to win it.

First licensed in 1950, Ray is operational on all bands 52 MHz. 1.8 MHz. to 39 MHz. and bands 52, 144 and 432 MHz. He runs 120 watts of a.m. on 52 MHz., using QEQ96/40 in the final to 9 element wide spread yagi or two stacked rhombics 360 feet per leg and 75 feet high. (Quite a choice—SLP.) The 9 element 100 feet high Converter and a 6CW4 front end. On 144 MHz. Ray runs 400 watts of s.s.b. to a 4CX250B to a 56 element array at 160 feet high. Converter and a 6CW4 front end. On 432, he is currently running 150 watts of a.m. (s.s.b. to follow), using a 4X156A to a 64 element extended-expanded array 123 feet high, solid state converter. The tunable i.f. for all converters is a Collins 75A4.

With this array of equipment Ray has worked on 52 MHz. VK1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 2, 3, and 4; ZK1, and all JA districts. On 144 MHz. he has worked VK1, 2, 3, 4, 5, 6, 7, and by satellite to ZL1AZR, and almost making it to VK8, VK9. By moon-bounce and using stacked rhombic antennas he has worked W6, W9 and W2. On 432 MHz. contacts have been made with VK3, 5 and 6. He has commented "no activity in VK2???" His plans for the future include completion of a 38-foot fully steerable beam for F.M.E. on 1560 MHz. and local work on 1296 and 432. He has a partially completed 50-foot dish which will employ feed steering with semi-adjustable holding frame. However, his work has been retarded considerably by the loss of a very good serviceman, and until another is found some of his projects will have to be delayed. His antenna farm at present is spread over about 8 acres with 100-foot towers dotted everywhere. Some years ago when I was there I was certainly impressed with the set up, and particularly of the 160 metre vertical, which was temporary as 161 feet high and which was constructed by Ray and hoisted up into position in ONE piece! Quite an imposing structure.

To conclude these notes this time, mention should be made that Wally VK5ZWW and David VK8A are still conducting moon-bounce scatter experiments on 52.016 MHz. Their efforts were rewarded on 14th November at Perth, where they recorded 90 seconds of s.s.b. moon-bounce. Wally was taking notes from David. No wonder Wally was babbling almost incoherently for several days after so much excitement! Good work chaps. (That's included because I have been invited to Wally's birthday party on 1st January—SLP.)

Thought for the month: "Things tend to even up. The more bodily weight you carry around, the shorter time you'll likely have to carry it." That's all for now, hope you are having plenty of DX and may 1974 be a prosperous and bountiful year for you. 73, Eric VK5LP. The Voice in the Hills.

SUPPORT PROJECT AUSTRALLS!

LIMITED SUPPLY OF—

CIRCLE BEAM MAPS 60c Per Free

Printed on heavy paper 20" x 30", Great Circle Map 16" diameter. Invaluable for all DXers and S.W.I.'s. Bearings around circumference allow precise beam headings to be made.

ALL MONEY TO GO TO "W.I.A. PROJECT AUSTRALS"

Cheques, etc., to W.I.A., P.O. Box 67, East Melbourne, Vic., 3002

Many Maps have been sold and we would like to thank all those people who have made donations over and above the price of the Map.

B.A.R.T.G. SPRING RTTY CONTEST

The committee of B.A.R.T.G. wish to thank your readers for their past support of these annual events which are organised in order to promote interest in the RTTY mode as used by Radio Amateurs and they hope that the Group will continue to enjoy the continued participation of readers in any future RTTY Contests that the Group may organise. The contest manager looks forward to receiving reader's logs or comments in connection with future RTTY Contests.

RULES

When: 0200 GMT, Saturday, March 13, until 0200 GMT, Monday, March 15, 1971.

The total contest period is 48 hours, but not more than 36 hours of operation is permitted. Times spent in listening periods are not counted as operating time. The 12-hour non-operating period can be taken at any time during the Contest, but off-periods may not be less than two hours at a time. Times on and off the air must be summarised on the log and score sheets. The Contest is also open to SWL RTTY operators.

Bands: 3.5, 7, 14, 21 and 28 MHz. Amateur bands.

Stations may not be contacted more than once on any one band, but additional contacts may be made with the same station if a different band is used.

Country ARRL Countries List, except KL7, K16 and VO to be considered as separate countries.

Messages exchanged will consist of:

- (a) Time GMT.
 - (b) Message number and RST.
- Points:
- (a) All two-way RTTY contacts with stations within one's own country will earn TWO points.
 - (b) All two-way RTTY contacts with stations outside one's own country will earn TEN points.
 - (c) All stations will receive a bonus of 200 points per country worked including their own. Note: if one country may be counted again if worked on another band, but continents are counted once only.

- Scoring:
- (a) Two-way exchange points times total countries worked.
 - (b) Total country points times number of continents worked.
 - (c) Add (a) and (b) together to obtain your final score.

Sample score: Exchange points (302) x countries (10) 3020
Country points (2000) x continents (3) 6000
Total 9020

Logs and Score Sheets: Use one log for each band and indicate any rest periods. Logs to contain: Band, Time GMT, Message and RST Numbers sent and received and Exchange Points Claimed. All logs must be received by 22nd May, 1971, to qualify.

Awards: Certificates will be awarded to the leading RTTY stations and SWL's. The final positions in the Results Table will be valid for entry in the "World Champion of RTTY" Championship.

The judges' decision will be final and no correspondence can be entered into in respect of incorrect or late entries.

Send your Contest logs to:

Ted Double, G6CPW,
B.A.R.T.G. Contest Manager,
85 Linden Gardens, Enfield,
Middlesex, England.



OPERATION FROM TWO N.Z. COUNTIES

The Gisborne Branch of the N.Z.A.R.T. has decided to operate radio stations in the counties with no permanent Amateur activities. The two counties are Waikohu and Waipatu.

Following is a schedule of bands and operating times:

Saturday, 6th February, 1971:
80 Metres: 1800z to 2400z
30 Metres: 1800z to 2400z
15 Metres: 1400z to 1600z

Sunday, 7th February, 1971:
80 Metres: 0700z to 1000z
30 Metres: 1900z to 1700z
15 Metres: 1400z to 1600z

Operators will keep a listening post and calls will be made every hour on the hour on the following frequencies:

Waikohu: 3875 KHz., 14225 KHz., 21310 KHz.
Waipatu: 3850 KHz., 14250 KHz., 21320 KHz.

OBITUARY

C. W. PETERS, VK5SV

We regret to announce the death of Charles William Peters, VK5SV, affectionately known as "Buffalo Bill". Bill passed away on 19th November, 1970, following a long illness.

First on the air in early thirties, Bill went through all the stages of early radio and had great fun with slot jar rectifiers and graduated through 240s, 210s, right through to the Swan 350.

Bill's kindly disposition endeared himself to all and he was at all times ready and eager to assist the younger members. Bill, unfortunately, had to retire before retiring age and it was then that Amateur Radio came to his aid. He will long be remembered as base station for the mobiles. He would call them in turn and see them all into their stables, as he used to say.

We extend our sincere sympathies to his XYL Eva, his son Bill and relatives.

CENTRAL COAST AWARD

Commencing from 1st December, 1970, a new award, to be known as the Central Coast Award, will be available to Radio Amateurs throughout Australia and the world.

The award is being sponsored by the Central Coast Tourist Authority through the Central Coast Branch. Details are as follows:

1. Operators of overseas stations may qualify by making radio contact with any two stations in the Central Coast area and by submitting log, together with two IRCs for return postage by surface mail.

2. VK operators (excluding Central Coast operators) can gain an award by contacting four stations in the Central Coast area plus the club station VK2AFY and submitting a log, together with 10 cents in stamps.

3. Central Coast operators can also gain an award by contacting ten stations in the Central Coast area plus the club station VK2AFY and submitting a log, together with 10 cents in stamps.

4. This award is made available as a h.f. or v.h.f. award. Operators must qualify on either h.f. or v.h.f. bands.

5. Logs to be sent to Awards Manager, Central Coast Branch W.I.A., P.O. Box 238, Gostford, N.S.W., 2230.



TELECOMMUNICATIONS AND ELECTRONICS (TE/-)

The second meeting of this Industry Standards Committee was held in October following a meeting of the executive of the committee. The chairman, Mr. P. R. Brett (P.M.G. Department), reported that all the technical committees recommended at the first meeting had been constituted and that the seven active technical committees had aggregated a total of 46 meetings. Several sub-committees have been formed covering such subjects as micro-circuits, radio-reception, radio transmission and serials, while a special panel had been formed to deal with polyethylene insulation of telecommunication cables. The committee organisation had been productive, with six new standards reaching the stage of public review, seven drafts being circulated for public review,

SUBSCRIPTIONS DUE

All members of the W.I.A. are reminded that annual subscriptions are now due and should be paid promptly to their Divisional Secretary. Non financial members will not receive a copy of "A.R." and back copies may not be available upon request. To preserve continuity of your files of "A.R." please pay your annual subscription now.

and many other documents currently under consideration.

Other matters discussed were the metrication programme, the programme of work and the formation of new technical committees covering capacitors, resistors and printed circuits.

The executive of the Telecommunications and Electronics Industry Standards Committee has met to discuss what may be required in their sector by way of metric standards. Their general comment was that the major problems would be associated with the supply of materials and components and with other mechanical engineering aspects of the industry rather than with electrical requirements, which are already effectively in terms of SI units.

The executive went on to analyse the type of problem that would be faced by the telecommunications and electronics industry, and noted that there would be some which would be matters for the Metric Conversion Board and its Advisory Committees, e.g. in relation to economic availability of basic materials in rationalised metric sizes, the time programme for conversion, education and training, and some aspects of instrumentation and test equipment. It was agreed that some matters would be some matters for reference to the S.A.A. Metric Standards Advisory Committee, such as conversion data and procedures, and rationalisation and preferred numbers.

Finally, the executive recognised that the technical committees under their supervision would need to consider both existing and future standards, to decide what was required by way of conversion of such standards into fully metric terms.

S.A.A. Monthly Information Sheet.



PROVISIONAL SUNSPOT NUMBERS

OCTOBER 1970

Dependent on observations at Zurich Observatory and its stations in Locarno and Arosa.

Day	R	Day	R
1	62	16	83
2	56	17	82
3	42	18	75
4	54	19	83
5	74	20	89
6	71	21	86
7	21	22	72
8	72	23	88
9	67	24	96
10	72	25	110
11	74	26	116
12	79	27	141
13	83	28	136
14	86	29	138
15	86	30	125
		31	116

Mean equals 85.0

Smoothed Mean for April 1970: 106.8

Predictions of the Smoothed

Monthly Sunspot Numbers

November 52	February 86
December 90	March 84
January 88	April 62

—Swiss Federal Observatory, Zurich

Dow Key Relays to Clear

● We offer three Model DK72 high powered rotary key relays. R.F. contacts are commonly used for switching antennas, etc., up to 500 MHz. Mounted in waterproof sealed cans for most mounting. Coil voltages: One 12V, D.C. Price \$11.50 A.C. and one at 24V, D.C. Price \$11.50 each.

● One only Model DK2-608 52 ohm 12V. D.C. relay. 1 contact. Designed for switching linears in and out. Price \$11.50.

● One only Model DK77 Miniature Co-axial Relay (BNC connectors). 28V. D.C. rated at 50 watts (50 Watts). Price \$2.25.

● Bulgin Rotary (Vasler type) Switches: S206 MBB 3-pole 8-position. 25 Cents each.

● S248 MBB 1-pole 8-position. 25 Cents each.

● Gelco Variable Capacitors designed for use with Pi Couplers in Gelcos 5222 Transmitters. Matched Pair \$9.30.

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PTY. LTD.

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VIC., 3000 Tel.: 01-2464

Overseas Magazine Review

Compiled by Syd Clark, VK3ASC

"BREAK-IN"

September 1970—
More Circuits and Diodes, ZL4IO. For the solid states.

T.V. Line Output Tubes as R.F. Amplifiers, ZL4IO. "For those in peril." The new improved bands these tubes have a life measured in minutes. Once the techniques are mastered there is no reason why they should not achieve 1,000 hours.

Burglar Alarms, Some Thoughts and Ideas, ZL4IHS. How to build and fit a device which will let the insiders know the outsiders are in.

October 1970—

Diode Signal Isolators, ZL4IO. Solid state switches.

Circuit for All VK3GK. Describes a simple method of drafting.

Up the Pole, ZL4IHY describes a tilt-over mast.

M.W.R. and All That, ZL1TA. Theory for those in need.

S.S.B. Exciter 9 MHz. Phasing Type, ZL4LV. Some additions.

"CQ"

October 1970—

A Solid State Permeability Tuned V.F.O. with Digital Readout, ZY2ZPC. Two IFs in between, a few other components and you are away.

CQ" reviews the Collins 36L-1 Linear Amplifier, W4AEF. Four 81A triodes and some cute tricks enable Collins to run 1 kw. to this linear from a built-in power supply which provides filament, bias, relay and 1300v. plate supplies.

An Efficient Multiband Loop Antenna, by GWNV/W8. Take one quad type element, turn horizontally, feed at the midpoint of one side with co-ax. and you have a simple antenna with an effective gain over a dipole.

Evaluation of the B-21, K2BZ. It even helped me to brush up my theory.

Digital CQ and Meteor Scatter Data Generators, Part 1 described the basic building blocks. Part 2 describes the circuits for four generators, two of each type, using the building blocks of the first installment.

The Resistor-Ratio WHEEL. This box uses five linear taper potentiometers with ranges of 100 to 1 megohm to provide any value from 0 to 1,111,111 ohms.

A Simple Audio Test Oscillator, W6JTT. Three transistors in a phase shift circuit.

The Case of the Elusive T.V.I., WBWVV. An interesting story of how a CB operator and an Amateur, who were blamed for causing T.V.I. tracked the source down to a colour T.V. receiver. Bushmanship was terrific.

"QST"

October 1970—

There is an interesting line-up of articles in "QST" for October. My vote for the "Article of the month" goes to Doug de Maw, W1CER, for his article "The Ham Builder's Nightmare." Solid state components have so altered the industry that many of the "receiving components" which could be used in transmitting applications are no longer available.

The Ham Builder's Nightmare, W1CER. Component problems for designer and builder are discussed and substitutes suggested.

A Frequency Counter for the Amateur Station, W1D. Designed to suit the Collins line of gear and provide digital readout of frequency.

The Tank Amplifier, W1CCP. 3.5 to 30 (or 20) dB depending upon whether you used 811As, 813 or 803. Types which are available from disposals. 500 watts input from a T.V. set transformer in voltage doubler power supply.

High Performance R.F. Converter, W1KLB and W1WPG. 100 to 10 with an 80 metre tuner. FET i.f. amp and FET mixer. Five bands.

Frequency Multiplication Technique for V.H.F. and U.H.F. S.B.B. DJ4ZC. Signal processing to eliminate distortion produced by conventional frequency multiplication methods.

A Scope Adapter for Transmitter Monitoring, W1KLB. Adds the usefulness of your c.r.o. to combination VSWR, SWR, Voltmeter and P.S. Meter for V.H.F., WA0UZO. 1, 10 and 100w.

i.s.d. forward and reverse. Inexpensive and accurate.

An External V.F.O. for the SB100 Transceiver, VK2ZJ. As I remember the spec for this SBE line, it did not cover the bands of interest in VK. Now it will.

Under the heading of Recent Equipment, the Heath GR-78 and Knight R-195 receivers are reviewed.

Australia Oscar, K2QBW. Ionospheric propagation results.

For the DXer the 37th A.R.R.L. November Sweepstakes and 36th A.R.R.L. International DX Competitions are discussed.

"RADIO COMMUNICATION"

September 1970—

A New Approach to V.H.F./U.H.F. Receiver Design, G3NNG. Part 2 continues with i.f. amplifier, board layout, etc.

A V.H.F. FET Dip Oscillator, G3HWR. Covering a frequency range of 29-460 MHz, this instrument uses a pair of T1888/2N345 FETs.

Technical Topics, G3VA. Synchrodyne Receivers, vertically polarised aerials, all-band vertical, directional verticals, Butler v.x.o. and other oscillator topics. Cathode coupled FET oscillators using MPF102.

Simplified Stripline Filter for 144 MHz, P. T. Bellamy. About 3 MHz. wide and centred on 145 MHz. Ideal for v.h.f.s.

"RADIO ZS"

August 1970—

80 Metre Transceiver, ZS8AJM. Small s.s.b. transceiver using valves and based on a "QST" article.

A Helical Whip Antenna Plus, ZS8JP. "The Rhodesian Mobile Antenna" is described as a wonderful gadget that can be tuned to any band, 10 to 40 metres, using a normal pi network. Winding details are given.

Some Linear Considerations, ZS8HF, Part 2. Power supplies.

Things Have Not Changed Much Over the Years, ZS1CD. The story of the Golden City Radio Club.

Intruder Watch, HSSABD. Rptd from "Ohm".

September 1970—

FET Front End and Pre-Mixer with Electronic Bandwidth, ZS8KB. Cnclude MPF102s.

Some Linear Considerations, Part 3, ZS8HF. A form of cathode coupled circuit which does not use filament makes and power measurements are discussed.

The H.F. Discosc, ZS8HF. The discosc is a vertically polarised, broad-band antenna with low v.a.w.r. over a frequency range of about 10/1.

Professor Nutsenhamm and the Speed Key, ZS6-21. A fantasy.

R.C.A. "HAM TIPS"

August 1970—

2 and 10 Metre Band Transceiver, K2BBX. Looks reasonably simple and uses those old fashioned heat generating electronic devices known as tubes.

"SHORT WAVE MAGAZINE"

September 1970—

The Milliwatt Six, G3WLT. Describes an all transistor ix for top band QRP operation. Basic 100 Metre Transceiver, G1BBD. Four stages in three valves for medium power input. Final Q3V8/22A.

Class B Push-Pull V.F.O. Design, G3BGJ presents another mathematical approach.

Linear R.F. Amplifier, G4HL. Described as a useful practical design which will cater for aerial feeder currents varying from about 20 mA. to 3 amp.

"73"

September 1970—

Integrated Circuit C.W. I.D. Generator, by W7UC. Automatic identification for your station.

Six Volts from Twelve Volts, K3GSY. Six buck load state voltage dropper.

The Indicating Oscillator, KH6AF. Another dipper circuit, 1-400 MHz.

Tuning U.H.F. Receivers, K1CLL. Clever infinite attenuator and oscillator unit.

Code Practice a la Baby Talk, WPXPA. Everybody's doing it.

Using Those Organic ICs, WA2IKL. Three testers will test most of the ICs you are likely to encounter.

Repeater Antenna Separation, K5MVH. One of the easiest ways to improve repeater ranges.

Diode Stacks, W2BDB. Replacing those high power rectifier tubes.

De Luxe Frequency Gain Control, VU2JN. Using one transistor and a zenor.

A New Approach to Communications Equipment, K3ALD. A call for manufacturing standardisation.

Read Relays for Co-axial Switching, W7CXY. Work very well for u.h.f. low power applications.

FBI Box Resistance Decade, WB4ITN. First in a series of file box test gear.

The DY-Comm. V.H.F. F.M. R.F. Amplifier, Staff. Transistorised, 15 watts out.

What's There in the Name? WHBF. The horrible truth about C.B.

Beer Can Two Metre Co-axial Antenna, by WA0RWQ.5. Drink your way to a good sign.

Converting 21 Volt Relays to 115V. A.C. Douglas. Using a couple of cheap diodes.

Versatile MOSFET Converter, WB6VYT. Low noise, high gain, ultra stable.

October 1970—

This month the accent is on IC Projects and the W2NSD distrib is that the ARRL will not let him run a "73" show at their National Convention.

Understanding and Using ICs. W2DNS explains the theory behind it all.

IC's Use America's Resources? W2DNS discusses the various types on the market and what they can do for you.

100 Watt 1.5 Regulator Circuits for Ham, WB2EGZ. Makes a simple regulated supply.

Camouflage. K9AZG describes one way of convincing your XYL that your new piece of gear "didn't cost much". My personal feeling is that the price here paid was too high!

The Phase Locked Loop Comes of Age, K5JKX. Synchronous detection and how the IC makes it practical.

IC's Use America's Resources? W2DNS discusses the various types on the market and what they can do for you.

IC Power Source, W1RAN. Simple regulator, Solid State Timer, WB4MYL. Ten minutes.

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IC Marker Generator, K4BCC. 200, 100, 50 and 25 kHz.

Interlocking Regulation, K6BW. In solid state high voltage supplies.

General Class Study Guide, Staff, Part 3. Power.

IC's in Romania, YO2BO. Peking being the iron curtain (very punny).



Book Review

"AMATEUR RADIO TECHNIQUES"

By Pat Hawker, G3VA. Third edition, published by the Radio Society of Great Britain, London, England. 208 pages, 9½ in. x 7¼ in.

This third edition of "Amateur Radio Techniques" is a somewhat enlarged version of the second edition published two years ago. Approximately 33 per cent. of the contents are new material. In this book Pat Hawker, G3VA, has successfully combined the best of all items presented by him as a monthly feature in the R.S.G.B. journal.

"Amateur Radio Techniques" is written in a straight forward and easily understood manner and is copiously illustrated with circuit diagrams. These alone provide a wonderful source of inspiration for the amateur.

The following is a list of chapter headings: Semiconductors, Components and Construction, Receiver Topics, Oscillator Topics, Transmitter Topics, Audio and Modulation, Power Supplies, Aerial Topics, and Fault-Finding and Test Units.

An appendix lists the I.P.s of most commercially built receivers, both disposals and present day.

The publication is not meant to be a textbook, nor does it attempt to supply the recognised Amateur Handbooks. However, the material contained in its pages, particularly in relation to semiconductors, will be of great value as a reference source for those just commencing to dabble with solid state devices.

"Amateur Radio Techniques" is a must for all Amateur, whether you are strictly conventional or prefer the approach or an inveterate home-brew man.

If you already have a copy of the second edition you will probably want this edition as well for the new information it contains. If you do not have a copy at all, then this book is a must.

The review copy came direct from R.S.G.B., and copies should be available shortly through the usual bookshops. British price is twenty shillings sterling.

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

CAN YOU HELP?

33 Spring Street,
Lismore, N.S.W., 2480.

Editor "A.R.," Dear Sir,

You may be able to assist me with some information or pass on my request to someone who can.

I have obtained an ancient radio receiver which I would like to put in working order. It is a 1924 American King's "Newtrodner" receiver. It is a d.c. five valver on 4.5, 90 volts, and was complete but for valves. I sought advice here and obtained four A908s and a UX228 for it. However, it performs not much better than a good crystal set. As it is in good order, I think it should be better despite its age. Possibly the tubes are in-correct. The UX228 has burnt out its filament. If the above performance is usual, it wouldn't need the volume control fitted!

I would welcome any information you may send, possibly from a collector of obsolete equipment who may know of. Consultations on "A.R.," it is a good magazine, I enjoy it.

Thank you for any information you may be able to obtain.

—John Alcorn.

"ASTRONET"

Editor "A.R.," Dear Sir,

Ever heard of such a net? It is my privilege to make an effort and try to explain all about the particular "net". Beginning with Apollo 12, the astronauts were instructed from ground control to dump waste water from the spacecraft at specific times. The "water dumpings" was done for the benefit of Professional and Amateur Astronomical Societies alike, around the world. The dumped water consists mainly of by-products of the electrical systems. Some of it is consumed by the astronauts, the remainder is jetted from the spacecraft. This jetted water forms a "water cloud" around the spacecraft like a "halo". The astronomical Societies are asked to observe the three magnitudes of brightness of the "vapour cloud" and furnish their findings back to Houston.

What has all this to do with Astronet?

Houston confirms the exact times of "dumpings" to Beilcon, who in turn passes the messages to Amateur Radio stations in the U.S.A. which consist of six call signs, "Astronet". Very little publicity has been given to this particular "Net" with the inevitable results. QRM. I have co-operated with our local Observatory in the past, who was supplied with various data, computer data sheets, straight from Houston, comprising the exact course of the Apollo's.

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Refer ad. "A.R.," December 1970, p. 22.

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SILENT KEY

It is with deep regret that we record the passing of—

VK2SV—C. W. Peters
VK3PI—L. F. Pearson

All we had to know was the times of the actual water dumpings, and that is where yours truly came in. The exact times were transmitted from Orlan's home GAT 21.285 MHz, and from 0100-0300 hours GMT on 14.255 MHz.

The point I would like to make is to urge the authorities to give this project its fullest support in publishing and asking Amateur Radio operators to keep the mentioned frequencies clear at those particular times. I can assure you that it was quite hopeless in the past, to note down figures and terms with which you are not 100 per cent. familiar, through the QRM.

So how about some co-operation from this side of the globe to give this project its fullest support; it darn well deserves it.

Footnote.—At present, negotiations with Mt. Wilson Observatory, California, are well advanced for the flight of Apollo 14, scheduled for take-off in the end of January 1971.

—Clem Stegkink, VK4FD.

TO AND FROM THE MOON

Editor "A.R.," Dear Sir,

May I submit the following information for possible future inclusion in "A.R."

On 12th June, 1965, from a transmitting site approximately 20 miles north of Brisbane, at 1800 hours 357, with a 30 degree rising moon, signals on 144 MHz. were successfully reflected and received from the moon.

The persons conducting this experiment were Don VK4ZAX, David VK4ZEK and Peter VK4ZPL.

As these chaps apparently have no intention of announcing their outstanding effort, I feel that full publication of these facts is highly warranted.

Regrettably, time has a habit of obscuring facts, and it is with this in mind only, that I request that this article be given sincere attention.

—John Blisgrove, VK4ZJB.

AX PREFIX MAKES SUCCESS OF AWARD

Editor "A.R.," Dear Sir,

I would like to take the opportunity through this column to thank the many Australian Amateurs who took part in the recent "Cook Bi-Centenary Award" and in fact all who during 1970 made use of the optional AX prefix. From the outset it was clear that the whole success of the Award would be dependent on the use by Australian stations of the AX prefix. The adoption of the new prefix by almost all active h.f. band operators was most gratifying and the basis of the subsequent success of the Award.

At the time of writing, over 1,600 Awards have been issued and as the closing date for applications is not until the end of this year (1971), the present total is sure to be substantially exceeded.

During the past year I have received many letters from overseas and local operators commenting upon the operating habits of Australian Amateurs using the AX prefix, unfortunately space would not permit reproduction of even a small percentage of these, but I can assure readers that in every case the writers had nothing but praise for the operating ability and courtesy shown by Australian stations. It is quite obvious that a very good image of local operators has been given to the rest of the world during 1970.

I hope at some future date to be able to give a breakdown on the number of countries, etc., which have claimed the Award, but as the entries are still arriving it would be a little premature to do so at this stage, the final figures I feel sure should be most interesting.

To all those who used the AX prefix I would again say "thank you" as the stations who obtained the Award did so ONLY through your efforts.

—Geoff Wilson, VK3AMK.

Federal Awards Manager, W.A.

[Amateurs are reminded that the permit to use the AX prefix ceased on 31st December, 1970.—Ed.]

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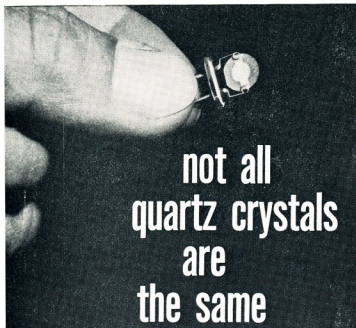
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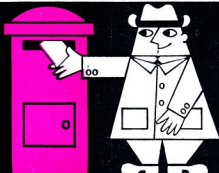
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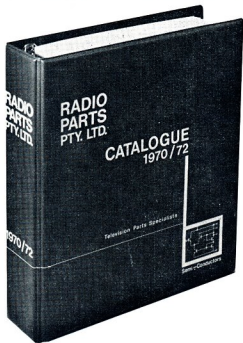
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